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THE COLORADO DESERT.

(From the *S. F. Chronicle*, August 31, 1890.)

'I'll bet my head that Yuma is south-east of here,' said an old, gray-haired prospector to me at the old Larkin ranch in Jacumba Valley in April, 1889. We parted. He was never again seen alive by man. He staked his head—and lost. One of his horses reached Flowing Wells, on the Southern Pacific Railway, and following back on the horses' tracks old Olsen was found beside the fatal waters of Fish Creek, with life extinct. His other horse was found cruelly tied to a mesquite tree, from which death alone had released it, forty miles away in the midst of the great Colorado Desert.

Tragedies of this nature have not been rare in the past in this desolate and terribly forbidding region, and they can usually be traced to the same causes, ignorance or indifference to the dangers before the traveller and misplaced self-confidence.

The arid region that forms the eastern portion of San Diego county, and known as the Colorado Desert, comprises about 5,000,000 acres of plain and mountainous country. In December last the writer proceeded in an easterly direction from San Diego, reaching the little frontier village of Campo on the following day, fifty miles distant from the coast. Thence to the confines of the Colorado Desert is a distance of thirty miles, which brings us to the deserted ruins of the old stage station known as Mountain Springs. The walls of the old stone house and the stone corrals are still standing about half-way down the precipitous canyon grade, and 200 yards to the right is the last mountain water that we shall see

Up and down the long, rocky grade, two to four full coaches drove at a reckless pace in the old days, carrying passengers and mail between Fort Yuma and San Diego. For the last dozen years, however, the road has scarcely felt the horse's hoof. A few venturous prospectors with their pack trains have passed along the historic route, many never to return; but, considering these years of neglect, the road is still in excellent condition. The cactuses stand like grim sentinels among the rocks, which rise in perpendicular masses on every hand. The hocotillo plant stands out picturesquely from the canyon slopes. Mosses and ferns look out timidly from the crevices of the rocks, quickly retiring before the burning rays of the summer sun, while the rattlesnake basks in the congenial heat or lies coiled beside a rock ready for its prey.

From the old stone house on an elevated bench against the side the granite mountain, the Colorado Desert lies spread out to the view in a grand panorama. The San Bernardino Range and its eastern continuation to the northward, the mountains of Arizona and Sonora to the eastward, Old Signal and the Cocopa Range at the south, with the plains of the great basin between, with the sleet and snow of the mountain range we had just crossed behind us,

it was a sight never to be forgotten. The balmy breeze quickly lulled our party to sleep on that January night as we reposed beneath the stars beside those old stone walls.

Coyote Wells was the next of the series of stage stations on the old Fort Yuma route, and there our party pitched its tents the following night. Only a pile of adobe shows the site of the old station-house, and a solitary mesquite tree is the only indication of water in the alkali plains surrounding the wells. The place receives its name from the fact that the water is so near the surface that the coyote wolf could dig in the clay soil and quench his thirst. The water is strongly impregnated with alkali; and when it gets low during the summer is not a desirable beverage. For nearly six weeks our party made use of this water, and many a night the odors from the well were wafted into my tent and lulled me to sleep. Marion D. Haydon and his son, Samuel, wintered about 500 head of cattle at Coyote Wells and at their adjoining camp at Dos Cabesas. The surrounding plains are sparsely covered with several varieties of brush, on which both cattle and horses browse with avidity. Foremost among these shrubs may be mentioned the franseria bush, with its burr-like seed, which is very nutritious. This grows in large oval masses a foot to three feet high, and usually in clumps several feet in diameter. The horses and mules in our party would snatch a bite of this whenever opportunity presented.

The deer weed is another promising forage plant for the arid regions of the West, the value of which I learned from Mr. Haydon, who has had an experience of fifteen years' residence on the desert and in the adjacent mountains. The deer weed is botanically known as Hosackia glcbia and belongs to the same family as the alfalfa and clover. It is a saffruticent perennial, one to four feet in height, forming large, bushy plants, which, when covered with its numerous small yellow flowers is conspicuously brilliant and beautiful. It receives its name from the reputed fondness that the deer exhibits for its nutritious branches. The plant is found throughout San Diego county blooming simultaneously in the dry streets of San Diego and on the burning plains of the desert, always choosing the dryest situations and usually the poorest soils, though it attains great size on our "red" lands. Mr. Haydon has cut and fed this for hay for three or four years with excellent results, and it is closely cropped by the stock on his range on the desert. The gietta grass is the only true grass that I have yet seen on the arid plains of the Colorado Desert in quantity to render it of any economic value. Hilaria rigida (its botanical name) is a stout, brittle grass, growing two to three feet in height, in large scattering bunches over a large portion of these sandy plains. It seems to only grow in the sandy soils along the arroyas at the base of these mountains, and was not observed on the rich alluvial soil along the New River. It can be readily cut in great quantities with a grubbing hoe, and

is naturally dry enough without the necessity of curing for hay. The stems are so full of starch as to be very brittle, and the grass is consequently exceedingly nutritious and hearty for horses or cattle. One good bunch was a good feed for an animal, and our horses and mules soon learned to like it and were kept in good working condition during our six weeks' experience in this apparently (at first glance) inhospitable region.

The alfilaria or Spanish clover has gained a permanent foothold in the vicinity of Dos Cabesas and promises to be one of the most useful forage plants for this arid region. It has not yet become very widely distributed, however, though it would doubtless succeed wherever once given a start. If other forage plants can be successfully introduced in this region, it will doubtless become an important stock-producing section, as there are millions of acres equally as well adapted to this industry as are the plains around Coyote Wells. If the United States would establish an experimental forage station in that region it would doubtless prove a profitable investment.

Nature is exceedingly provident and thoughtful for all her subjects. One who has crossed the dreary basin through which the Southern Pacific Railway runs would scarcely look for a new garden vegetable to have its origin there. There can be little question that the desert once supported a comparatively large Indian population. Along the New River, within the memory of man, the Indian cultivated extensive gardens, and traces of their work can yet be seen on those rich alluvial bottoms. Corn and melons and other products of the soil were produced by them in bountiful profusion and they had enough and to spare. But, like his race in many other sections of our coast, the Indian cultivates the soil no more. The hundreds and thousands who formerly roamed over our mountains and occupied the valleys have disappeared, and only a few are left to represent them. Among the native plants which are known to have contributed to the support of the desert tribes the wild onion or 'day lily of the desert' (Hesperocallis undulata) was unquestionably one of the most important. It is not rare on both the Mojave and the Colorado Deserts, and is known as far south as the southern part of the California peninsula. It is one of the most beautiful and characteristic plants of the arid region of California, and is destined to prove a welcome addition to the garden because of its white fragrant flowers, if not an acquisition to the farm. It produces a large edible bulb, varying from one to four inches in diameter, nearly round, of a fine texture and with a pleasant taste, whether eaten raw or cooked like onions. Our party of seven had them cooked at nearly every meal after we first tested their qualities, and in the lack of other vegetables found them very acceptable. The bulb is found in sand or fine, gravelly soil, in which the plant thrives best, and is usually resting on gravel or a clay subsoil. The Indians obtained both food and drink from this plant, and the

traveler is safe if he knows how to search successfully for it, for once found he need not fear either hunger or thirst.

During January we experienced very cool nights and usually found ice every morning at Coyote Wells. Vegetation was consequently very backward and few flowers wers seen. Forests of ironwood, mesquite, palo verde and other trees were found not far away, and some beautiful country was traversed. Game was plenty. Antelope, deer, mountain sheep, quail, rabbits and coyotes are to be found between the Cocopa Mountains and the main range of the peninsula, and, not being accustomed to being hunted, they were comparatively easy to approach. Lake Maquata, the mythical lake west of the Cocopa Range, was dry. Four years before it was full of water, the overflow of the Colorado River, and teeming with millions of fish. Its dry banks and beds are now strewn with the bones of fish that were evidently fully two feet in length, on which the coyote feasted for many a day.

Oyster shells as large as dinner plates, now turned to stone are to be found in the low clay and sand hills. Large mounds of smaller oyster shells, several hundred feet in height, exist near the Carisso Creek, and prove conclusively that this basin was once a great inland sea. Vast quarries of beautiful marble, the finest sandstones for building purposes, and excellent granite exist among the surrounding hills. What wealth of precious minerals exists beneath the weather-stained rocks we may never know. Of this we can be certain, however, that this great region is yet destined to be of service to mankind, and it may support a great population and supply our tables with the horticultural products of the tropics.

C. R. Orcutt.

LINES FOR AN ALBUM OF SEA ALGÆ.

A hint of the beautiful plants,
That grace the blue waves of the sea;
Just fragments adrift from the shore,
Are gathered my dear, here for thee.

The algæ, alive and aglow,
Sparkling, dripping with the salt spray,
In their own bright ocean home,
Make a brilliant and free display.

And as much more graceful are they,
Than the dry, dim specimens here;
So much more the love of my heart,
Than words can assure thee, my dear.

E. E.

A MARINE LABORATORY.

(From San Diego *Union*, Sept. 8, 1890.)

One of the institutions for which the Pacific Coast stands in urgent need is a marine biological laboratory, for the prosecution of original investigations and for study of marine life. The fauna of the Pacific waters of the United States is very little known, and the facilities for work in this direction at present in existence are practically none.

On the Pacific Coast, from Alaska to Cape Horn, the labors of the systematic zoologist are by no means at an end. New species and forms of life are almost daily observable in our waters, and in no portion of the coast region referred to are there greater opportunities for the prosecution of this work than at San Diego.

San Diego stands next to Monterey in the number of recorded forms of marine life. Our San Diego fauna, I believe, has of late years found to possess even a greater variety of marine life than Monterey. The San Diego fauna possesses additional advantages, however, in not only having a fair admixture of northern types, but in also yielding a large number of forms belonging to the warmer waters to the southward.

In the vicinity of San Diego there are two localities every way adapted to the needs of a biological station. One of these is at La Playa, on the west side of San Diego Bay, near the entrance to the harbor. At La Playa a great diversity of conditions of the beach exist—such as shingly and sandy beaches, rocks and clayey shales adapted to the requirements of the burrowing mollusks, and broad stretches of sand and mud to the northward.

[The other locality adapted to the needs of a marine zoological laboratory especially, is a point on False Bay, between Pacific and Ocean Beaches, which from its proximity to the San Diego College of Letters, at Pacific Beach should be easily established and equipped by friends of that institution. This could be done without financial loss to any party, and with very material gain to San Diego interests. Of the two stations mentioned, La Playa is preferable, however.]

The subject was recently brought before the California Academy of Sciences at San Francisco, by Mrs. R. S. Eigenmann, and among all the places suggested for such an institution, San Diego was mentioned as the most desirable location. San Diego should not be backward in utilizing the natural advantages which she possesses. The establishment of such an institution would mark an important era in the history of education not only in San Diego, but on the whole Pacific Coast. To fully present its claims upon the public for the benefits which a marine biological laboratory would confer, would occupy more space than is at my disposal, and can best be understood by actual observation of it in operation.

C. R. Orcutt.

CORRESPONDENCE.

EDITOR WEST AMERICAN SCIENTIST:

SIR:—By mail to-day, I send you a specimen of moth, (Coloradia pandora Blake), one of a large number captured on our streets, attracted by the electric lights. They surround the lights in vast numbers, flying against and into the glass globes, filling them up to such an extent as to darken the lights.

They have an expanse of wings about three and a half inches, length of body one and one-half. Beautiful plumose yellow antennæ about one-half inch in length. General aspect dark grayish brown above, with pink and grayish brown under wings on which are four dark spots and wavy lines of lighter and darker shades and with a faint marginal trimming of white. Abdominal rings conspicuously marked with white and also a white transverse mark across the prothorax. Being nocturnal in their habits they have never been observed before by the inhabitants and are considered by them to be a strange visitation of bugs that have never been here before, while the fact is they have been all around us in large numbers all the while and until the glare of the new electric light has attracted them almost by millions they have remained unnoticed, reminding us of how much there is immediately around us which we never see.

Truly yours,

Aurelius Todd.

Eugene, Oregon, July, 1890.

EDITORIAL.

Exploring the Colorado Desert in the interests of botanical science, our editorial duties have necessarily to be slighted. Our readers must be contented with a witty editorial (brevity is the soul of wit) this month.

NOTES AND NEWS.

Mr. John Muir, the California naturalist, has contributed to *The Century* two papers on the region of the Yosemite. These will be illustrated and will appear in the August and September numbers of the magazine. The August paper is entitled the 'Treasures of the Yosemite' and deals exclusively with the valley itself, including graphic descriptions of the waterfalls, in each of which Mr. Muir finds a distinct individuality. A touch of adventure is imparted to the article by the author's account of his observations at the brim of the Yosemite Fall and behind it, and by his description of a sublime winter storm, a feature of which was fifty-six temporary falls in the upper end of the valley alone —as Mr. Muir says, 'probably the most glorious assemblage of waterfalls ever displayed from any one stand-point.' Mr. Muir sounds a warning note as to the destruction in the Yosemite region by the 'sheepmen' and by the operations of the large mills upon the

trees of the lower part of the Sequoia belt. He strongly endorses the project for the creation of a National Park about the Yosemite, and among the illustrations of the article are views of the valley itself and a map of the proposed boundary of the new Park, besides three process reproductions showing destructive work in the present Yosemite reservation, of the conduct of which there has recently been so much criticism. *The Century's* series on 'The Gold Hunters of California,' which will be a leading feature of the season of 1890-91, will be begun in the November number.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department).

Recent accessions to the library of the West American Museum of Nature and Art will be catalogued monthly.

4021. West American Oaks, illustrations of, from drawings by the late Albert Kellogg, M. D., the text by Edward L. Greene. Published from funds provided by James M. McDonald, Esq., San Francisco, California, May, 1889 (issued April 25th). Part II, dated June, 1890. Quarto, 84 pp., 37 plates.

Mr. James M. McDonald, in presenting this contribution to American botany, has rendered a great service to the science, and a worthy memorial to the life and labors of Dr. Kellogg. As a monograph, it is to be regretted that Prof. Green could not have rendered the work more complete, and it is especially unfortunate that he should have seen fit to ignore wholly the work of some of his cotemporaries. The bibliography is thus rendered incomplete and as far as it relates to Southern Californian species the work is far from perfect. Quercus Palmeri is figured for the first time. Quercus pungens Liebmann (as identified by the late Dr. Engelmann) is described as new under the name Q. turbinella. The existence of Quercus Emoryi in Baja California is overlooked, while various forms are described by Prof. Greene as new species or varieties, some of which, it would seem to the writer, would be difficult to recognize. However, it is as a whole, a very valuable contribution to West American botany, and we shall welcome the companion monograph on West American Coniferae, which we understand is to appear later.

4022. The Marine Climate of the Southern California Coast and Its Relations to Phthisis. By P. C. Remondino, M. D. Reprinted from Proceedings of Southern California Medical Society. Octavo, 58 pp. 1890. From the author.

4023. Longevity and Climate:—Relations of climatic conditions to longevity, history and religion.—Relations of climate to national and personal habits.—The climate of California and its effects in relation to longevity. By P. C. Remondino, M. D. Read before the Medical Society of the State of California, at Los Angeles, April 17, 1890. Octavo, 44 pp. From the author.

4024. Essay on the Use of Nitrate of Soda for Manure, and the Best Mode of Its Employment. By Joseph Harris, M. S., Moreton Farm, Monroe Co., N. Y. Copyright 1890. Octavo, 96 pp. Price 10 cents. From the author.

4025. The Sugar-beet Industry. Culture of the sugar-beet and manufacture of beet sugar. By H. W. Wiley, chemist U. S. Department of Agriculture, Washington, D. C. 1890. Division of chemistry, bulletin No. 27. Octavo, 255 pp., 11 plates.

4026. Notes on Some Species of Gall-gnats (Cecidomyiae). By T. D. A. Cockerell. Reprinted from the Entomologist, London, 1890, pp. 278—282. The notes are based on gall-gnats found in Colorado. From the author.

SAN FRANCISCO MICROSCOPICAL SOCIETY.

At the regular meeting of the society held at its rooms October 1st, Carl H. Eigenmann, Ph. D., called attention to the results of some recent investigations in cell division made by Dr. S. Watase of Clarke University, which the speaker illustrated with drawings on the black-board. The observations noted were somewhat at variance with those formerly observed by scientists, and led to some new theories. Previous researches have shown that the nucleus in the tissues of the higher class of plants and animals consists of a capsule containing a plasma of "achromatin" not deeply stained by reagents, ramifying in which is a reticulum of "chromatin," consisting of fibers which take a deep stain. When the cell is about to divide into two, definite and remarkable movements take place in the nucleus, resulting in the disappearance of the capsule and the arrangements of its fibers first in the form of a wreath and subsequently in the form of a star. Dr. Watase's observations have been made chiefly on the embryonic cell, and he finds that the phenomena are quite different from what have previously been accepted as the mode of separation and division of these fibers. Instead of assuming the form of a wreath, the fibers form a longitudinal zone, gradually separating at the terminal and finally through the whole mass of protoplasm, when complete division takes place. Each of these bundles then arranges itself, together with the associated achromatin into a nucleus such as was present in the mother cell to commence with. This Phenomenon is termed "Karyokinesis." Dr. Eigenmann's remarks were attentively listened to, and called forth questions and remarks from members.

Dr. J. M. Selfridge presented to the society, on behalf of Dr. C. M. Selfridge of Port Townsend, a small quantity of mud dredged from the bottom of the sea off the coast of Queen Charlotte's Island at a depth of 1,566 fathoms, by the scientific corps of the steamer Albatross.

Mr. Riedy exhibited a beautiful slide of *Bacillus Tuberculosis* from sputum, prepared and stained by Dr. Sherman of Merced. The bacilli were very numerous and well developed, and the work of the preparer was very favorably commented on.

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The July number of the AMERICAN NATURALIST will be made especially noteworthy and valuable by an illustrated article by Prof. Cope, on The Cetacea. The illustrations for this article have largely been made from specimens obtained by Prof. Cope himself, and many of which are now in his possession. The article will be a masterly resume of the present state of the most advanced scientific knowledge in this highly interesting department of zoological investigation.

*** The December number and index for the year 1889 are now ready, and will be sent to any address on receipt of the regular price, 40cts. This is the last of the back numbers to be furnished, and the magazine will hereafter be published strictly in the month whose date it bears. 40 cents a number; $4 00 a year. FERRS BROS., PUBLISHERS,
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VOLUME VII. DECEMBER, 1890. WHOLE NO. 55.

THE

West American Scientist.

A popular monthly review and record for the Pacific Coast.

Official Organ of the San Diego Society of Natural History.

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VOL. VII. DECEMBER, 1890. WHOLE NO. 55.

PARRY'S LOTUS TREE.

(From the Mining and Scientific Press, LIII, 391.)

The trees around them all their food produce,
Lotus their name divine—nectareous juice!
Hence *Lotophagi* called, which who so tastes
Insatiate riots in their sweet repasts,
Nor other home, nor other care intends,
But quits his house, his country and his friends.

Homer's Odyssey.

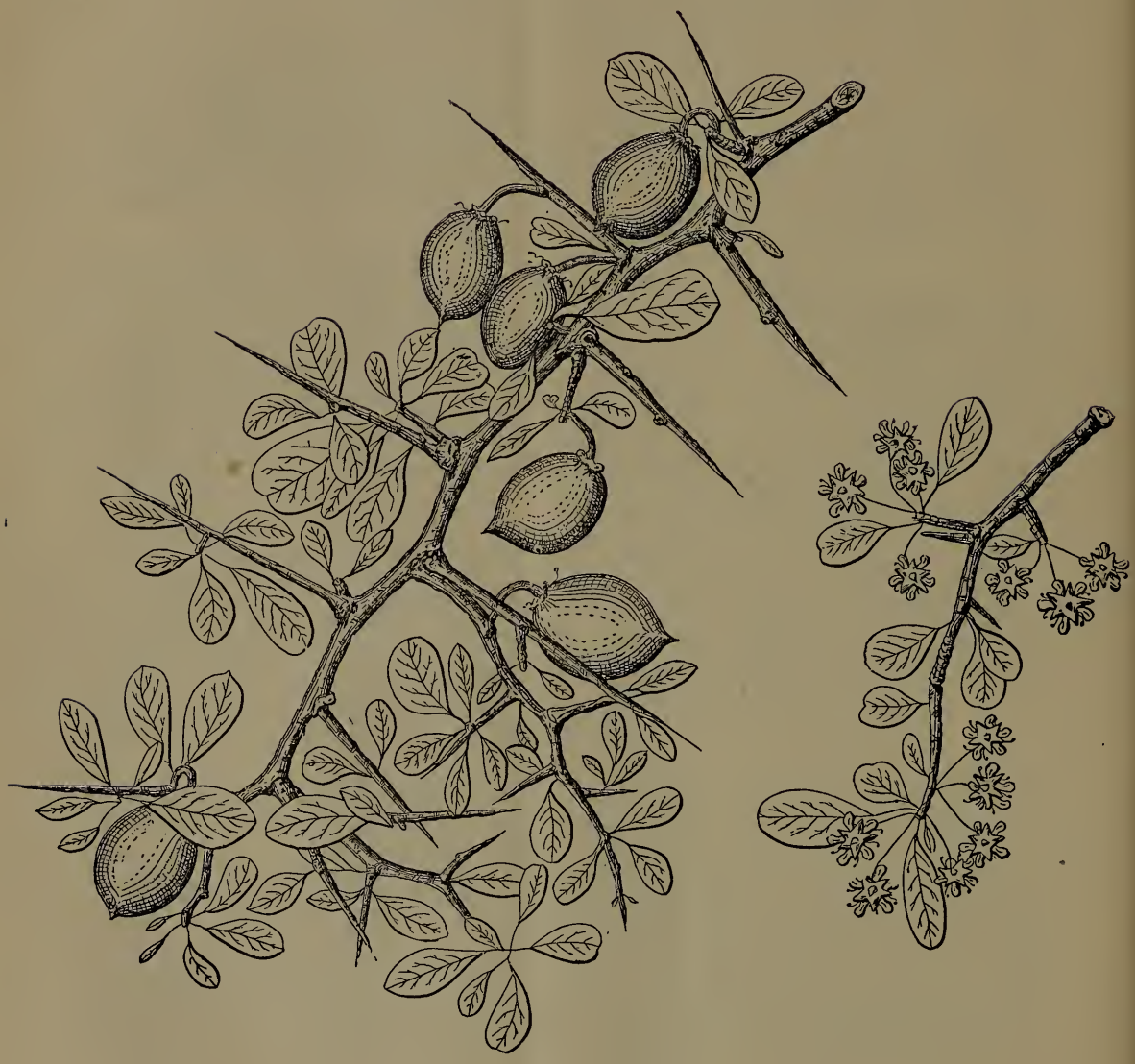
Although mention is made of this native fruit (Zizyphus Parryi) in the California State Board of Forestry's catalogue of trees and shrubs desirable for culture, nevertheless such a compiled list must needs be very brief to come within due limits assigned, hence further details may become desirable.

Common perception recognizes the truism that where native families, genera and species of trees, shrubs and plants abound, they furnish the best presumptive evidence—it not always proof—that other kindred and choicer sorts will suit similar situations, climatic conditions and soils, often vastly widening in their range.

With our intelligent culturists and nurserymen, it seems needless to urge that the almost universally preferred practice is to resort to the wilds for the strongest seedlings as stocks for propagating purposes. Therefore, with this in view, we offer a short description, with pen and ink sketch, of our own native lotus, in order to facilitate ready recognition and to designate the best known localities for procurement of the seed supply. Withal summary suggestions of a few foreign sorts that might well supersede the native jujube, and here and there intersperse a practical hint or so to profit, or of economic and commercial value.

Parry's Lotus or Jujube is a zigzag, branching, thorny bush or small tree, four to sixteen feet high, seldom over four to six inches in diameter. The leafy spines are long, stout and straight, leaves entire and small—less than one inch—blunt or notched at the top, wedge-shaped, narrowing into a slender, short leaf-stem, one to three flowers, recurved in fruits, and this one to three seeded, mealy and nearly dry, oval, one-half to three-fourths of an inch long, apex short-pointed on a curved stem of one-half an inch or so in length. Mostly a shrub well suited for more eminently useful hedges; abounds in gravelly ravines near San Felipe, San Diego county, also at Rock House summit, of the same region, and east of San Bernardino, California.

Before inviting specific attention to the most commendable species for culture it seems requisite to make a few concise remarks on jujubes in general; for out of half a hundred or more we can now refer to only a few. Jujubes are among the most feasible, if not the best of fruits in the world for jellies and various preserves, or dried, and for a sort of bread or cakes, pies,



ZIZYPHUS PARRYI.

or served as desserts like dates and figs; in short, one way or another they are eatable and mostly excellent. It would be safe to say that four hundred to five hundred trees to the acre—of almost any soil—could be planted, that at two or three years old would yield five to ten pounds to each bush. With any market at all, the fresh fruit would be cheap at a dime a pound for jellying in the rural way; they would thrive well with less care than a common corn patch; would double, quadruple and quintriple in four or five years at the furtherest, and thence onward for ages, would pay better than strawberries, with half the labor and not a tithe of the trouble in harvesting, nor risk of loss; would even utilize the worst land; have the world for a market, of the dried fruit and jelly, with other uses to be noted further on.

Classic Lote Tree (Zizyphus lotus). This is a small tree common to Persia, Africa, Sicily and Spain, and is now cultivated in all regions of the olive, the vine and the fig. Tunis was the ancient land of the renowned people known as Lotophagi. This sweet fruit is of the size of sloes, with large stone, and is borne on every part of the plant like gooseberries, purple-tinged; the farinaceous pulp—separated from the pits and sun-dried—is set aside for winter use; has the flavor of dates and figs. A kind of wine or beer drink is made by expression, diluted with a little water, but will keep only a few days; doubtless immoderately used in this or some similar way may have led to a devoted dissipation akin to the poet's conception.

It should be observed, in a general way, that this and all the species are eminently adapted to the borders of deserts—delight in arid sands, gravelly ravine sides and rocky ridges—would preserve embankments and prevent fearful washouts without serious obstruction to railroads or casting a length of blighting shadows; but they will grow in any soil. Fruit described as of delicious taste in the fresh state; also, after exposure to the sun a few days, they are pounded and made into bread. These paste-cakes are only sun-dried so as to well evaporate the little moisture used in making; it resembles, both in color and taste, what we designate as 'gingerbread,' and is noted as excellent food for long journeys.

From the thorny nature of the Loti, one might well wonder how the fruit could be collected with facility, but as it is neither tender not watery, and somewhat farinaceous and leathery-like and the shrub hardiest of the hardy with tough and elastic twigs, a cloth is spread on the ground and the bush beaten with a stick.

This Lotos of the Lotophagi must not be confounded with the Egyptian lotos (Nymphea lotus), nor with the lotos of Homer and Dioscorides, which is a species of (amatory?) Trifolium, inciting, if not causing, a similar infatuation, as the one eaten by the natives of the Pacific in their season; nor with the lotos of Hippocrates (Celtis Australis), nor with the Italian lotos (Diospyrus lotois).

Common jujube (Z. vulgaris).—This is a small tree, of twen-

ty feet in height, fruit blood-red or saffron, with a sweet granular pulp. In the south of Europe it is mostly served up in the dried state, as a choice sweetmeat of the winter season, known as jujube. The Turks plant these with other trees in front of their coffee houses that they may enjoy shade, shelter and fruit together,

EAST INDIAN JUJUBE TREE (Z. JUJUBE).—Also a small tree of sixteen or twenty feet, cultivated in China and Cochin-China, bears fruit of the size of a large cherry, smooth and yellow when ripe. There is however a variety of this, or perhaps another species, that produces an excellent fruit of oblong form, of the size of a hen's egg, known by the name of *Narikellekool.*

PEAR-WOOD JUJUBE (Z. XYLOPYRUS).—This tree abounds everywhere in the forests of Coromandel. Cattle eat the leaves, young twigs and fruit; the kernel, of which, the natives are very fond, has the fine flavor of filberts. The timber of the largest trees is also highly esteemed, is of yellow orange color, very hard and durable, and withal very light. Most timbers combining such rare qualities for many uses proved too heavy.

A kindred shrub (Paliurus), and one of this genus, the Christ Thorn (Z. Spina-Christi), are both equally common in Judea. The former cap, or crown-fruited; the latter double-thorned with fruit like a sloe. Rival authors refer to the plausible pliability of their exceeding flexible twigs, being readily wrought into any form, as having been the one put upon the head of our Savior.

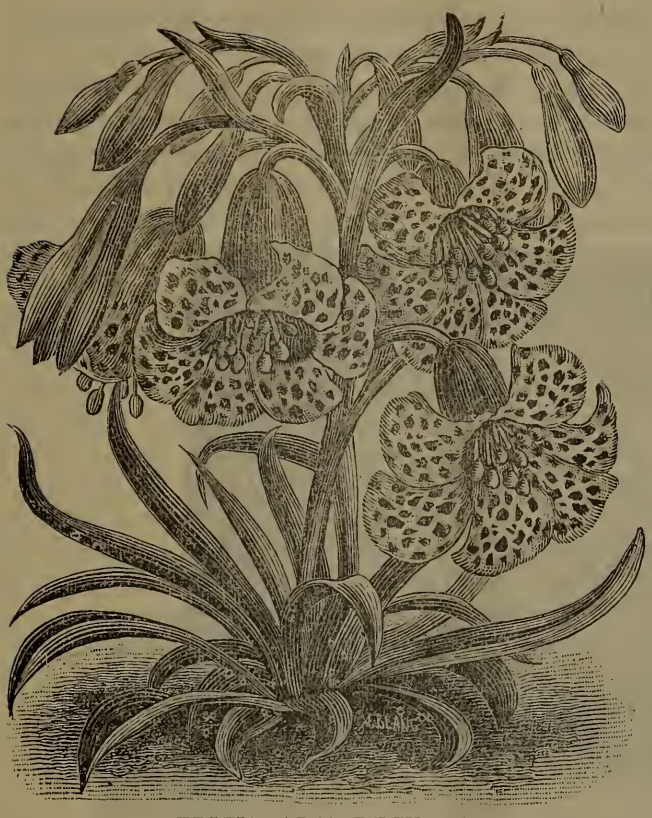
Lote trees may be multiplied by cuttings from the roots or ripe twigs, with care, from layers and root slips, suckers and seeds. These budded or grafted from a few choice foreign parent trees would soon yield a progeny of many millions, adding to the wealth of the Pacific, and an annual income to California alike counted by unnumbered millions.

Our pen picture is from a specimen contributed by Dr. C. C. Parry, whose name it bears, and is furnished through the liberality of the California Academy of Science. *Albert Kellogg.*

FRITILLARIAS.

(From the *Pacific Rural Press* xxxviii, 418.)

These comprise seven or eight Californian species, all very similar in stalk and leaf and shape of flower, but in great variety of color and mottling, and with curious forms of bulbs. Those who are familiar with lilies know that there are some bulbs which vie with the blossoms in beauty. The Fritillarias, too, have some beautiful bulb forms. One type is a round flattened disk, clean, shiny and white, beaded and covered with little rice-like, ivory white bulblets, which fall off at the touch. This is the bulb of F. recurva and F. lanceolata. F. biflora and F. liliacea have another form, in which the bulb is formed of a few, rounded clear white scales, easily falling apart, and each section propagating the plant, as do the little grain like bulblets of the others.



FRITILLARIA RECURVA.

The stalk of Fritillaria is stout and erect. The stalk leaves are arranged in circles on the stem, ten or fifteen long leaves in a whorl. At the base there is a single large leaf, sometimes in F. lanceolata as large as the hand. The Fritillarias are usually profuse bloomers; the blossoms an inch or so across, pendant bells strung on the upper part of the flower stalk, sometimes a few but often a string a foot long, and comprising a dozen or more blossoms All are of elegant habit, one of those perfectly graceful forms which delights the eye in outline, all curves, and symmetry. Several species are more elegant in habit than rich incolor. Fritillaria lanceolata, F. biflora and F. pluriflora have curiously mottled flowers, in shades of green and brown, very odd but hardly pretty; but, on the other hand, F. recurva, with its scarlet bells, is as beautiful as any lily, The yellow bells of F. pudica are very attractive, and F. liliacea gives variety with its white blossoms.

All are easily cultivated, preferring a gritty soil with leaf mold and partial shade, but doing well in almost any well drained soil. Well grown specimens will reach three and four feet in height, and I will hardly dare to tax the credulity of the reader with the number of flowers that have been grown on one stalk.

Carl Purdy.

SOME NOTES ON ECHINOCACTUS.

(From Garden and Forest, iii, 238.)

The genus Echinocactus is represented in SouthernCalifornia by a great diversity of forms which nearly approach each other. The Cactaceae are generally recognized as very difficult to study, not, perhaps because they are characterless, but because of the difficulty of making specimens and the usual lack of material for study. Only by very extended and close field observation can

one arrive at correct conclusions relative to species and varieties, and this none of our botanists have yet enjoyed.

Near San Diego the genus is represented by E. viridescens Nutt., usually a low, depressed plant of about thirteen ribs, with pale straw-colored flowers and a slightly acid, pleasant fruit. This is a maritime species or variety almost wholly restricted to the immediate neighborhood of San Diego.

ECHINOCACTUS CYLINDRACEUS.

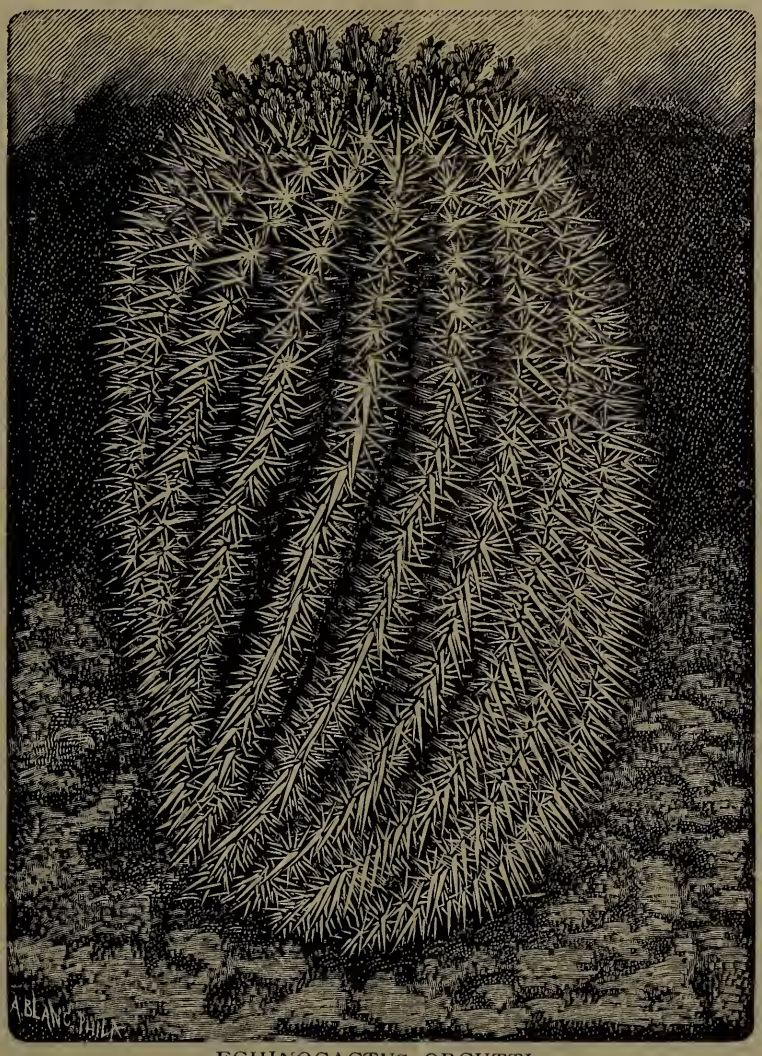
Echinocactus Orcuttii, Engelm., is found a little further to the south and further inland from the coast. It differs in size, the number of ribs (usually twenty-two to thirty) and in the young plants, which are globose. It is inclined to grow in cæspitose clumps of fifteen to twenty cylindrical heads, around which the ribs are often spirally inclined. It seems to form almost a connecting link between E. viridescens and E.cylindraceus, Engelm., which latter was originally collected by Dr. Parry on the eastern slopes of the mountains bordering the Colorado Desert, in San Diego county. Dr. Engelmann was at one time inclined to doubt the right of E. cylindraceus to specific rank, as other botanists are still inclined to doubt. In 1882, I found what I determined was E. cylindraceus in the desert cañons of Lower California, and also west of the mountains near the San Rafael valley, and Dr. Engelmann wrote that he concurred with me in that opinion. This cactus was a fine cylindrical plant, encompassed by a fine network of its slender, recurving white spines, with lemon-yellow flowers.

Echinocactus Lecontei, Engelm., is another species originally credited to the Eastern slope of our mountains and to Arizona. Hundreds of plants annually reach the European market under this name, collected within the confines of the Colorado Desert, which differ only in a slight degree from E. cylindraceus. This form is more inclined to a grayish color, less flexible spines, and perhaps to a more globose shape. The demand in Europe for

this particular species makes it command a higher price than many others, and it was only recently that I learned whence the trade was supplied. As they are collected near the original locality cited for it, no blame can attach to those who endeavor to supply the demand, but I must consider it merely a 'trade name' for a form differing in no essential character from other plants yearly sent out under this, the preceding and the following names.

Echinocactus Wislizeni, Engelm., is the oldest name applied to any of these forms of cacti. Some of the plants received under this name are beautiful, with white spines like those of E. cylindraceus; others have exceedingly handsome red spines; still others have dull spines of no special color. In young plants especially the color of the spines is very variable.

Echinocactus Emoryi is the last of our Californian species to receive notice. It more nearly approaches the two first mentioned species, the reddish spines and flowers being usually the most characteristic features. But along with the red-spined and



ECHINOCACTUS ORCUTTI.

red flowered plants, I have found other varieties, white, green, brown and other shades in flowers and spines—until no constant character can be found by which to distinguish between them.

English cacti-culturists claim that E. Orcuttii is identical with the old E. Californicus, a name considered synonymous with E. viridescens by Dr. Engelmann. A great variety of plants have reached the European market under the latter name, which, considering its natural variations, is not to be wondered at.

I have carefully studied every form in Southern California, and northern Lower California that I have been able to learn of, and I have been forced to the conclusion that only three true species exist within our limits: E. polycephalus (belonging to a distinct section of the genus,) E. Wislizeni and E. viridescens. Under E. Wislizeni I would class as varieties E. cylindraceus and E. Lecontei; while under E. viridescens I would place E. Emoryi and E. Orcuttii as sufficiently well-marked varieties. Several other varieties of both these species could be sufficiently distinguished to satisfy the foreign trade. Perhaps these views will not be retained when I become more familiar with Arizona, New Mexico and Mexican forms, but they are certainly in line with the later views of Dr. Engelmann, the greatest authority on the family that we have had.

C. R. Orcutt.

PAPAVER CALIFORNICUM.

(From Garden and Forest, iii, 385)

This true poppy, the only one indigenous to California, was discovered in 1886 in the Santa Inez mountains by Mr. John Spence, of Santa Barbara. It was described by Dr. Asa Gray in the Proceedings of the American Academy of Arts and Sciences, Vol. XXII, pp. 313-314, thus being one of the last California flowers to receive a name at the hands of that illustrious botanist. Not only is it one of the latest discoveries, but it justly ranks among the handsomest of the annuals of the Pacific Coast.

It is rarely found except on ground which has been burnt over, Mr. Spence first finding it far away from any cultivated fields at an elevation of 1,500 to 2,000 feet, on ground which had been covered principally with manzanita bushes, but had been burned over the year before. Probably for this reason and from its close resemblance in appearance to Meconopsis heterophylla, a less showy plant, but with flowers almost identical in size and coloring, it owes its escape from previous discovery.

As Dr. Gray suspected, this is not a local species, but is apparently widely distributed in Southern California, having recently been collected by several botanists in widely separated localities, but everywhere under similar conditions as first found, on tracts of burnt brush-lands at from one to two thousand feet elevation. This spring I observed it in great abundance back of San Diego, near Potrero, and also between the Cajon and Santa

Maria valleys on hillsides burned over by forest or brush fires last fall. Although I have traversed both sections repeatedly during the past ten years, this richly colored flower had never been seen before these fires had denuded the land.

It forms a fine, bushy plant about a foot in height and bears a profusion of large showy flowers of an average of two inches in diameter. The color of the large delicate petals is a bright saturn red to orange chrome, with a center of a delicate sulphur yellow. In cultivation it is said to make a fine pot-plant, and if it improves as most of our wild flowers do under the attention of horticulturists, it will prove a most desirable addition to American gardens.

Associated with it is usually found Phacelia Orcuttiana, another so-called 'fire-weed' which is likely to prove a welcome acquisition to the garden on account of its masses of white flowers with conspicuous yellow centers. This Phacelia grows into a tall, stately plant, branching freely from the base.

It is an interesting problem why the seeds of these handsome plants should lie dormant so many years in the soil, awaiting the —to them—life-saving, destructive fire. After once starting into existence, the seed does not seem to require to pass through the ordeal of fire before growing, for the second year after a fire they appear in greater abundance than the first. Gradually, however, as other plants get re-established on the ground these become fewer and fewer, until other vegetation overcomes them, and their seeds again lie dormant in the soil awaiting another deluge of flame. *C. R. Orcutt.*

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the Library of the West American Museum of Nature and Art will be catalogued monthly.

4027. Contributions to American Botany, XVII. I. Miscellaneous notes upon North American plants, chiefly of the United States, with descriptions of new species. II. Descriptions of new species of plants, from northern Mexico, collected chiefly by Mr. C. G. Pringle, in 1888 and 1889. By Sereno Watson. From Proc. Am. Acad. Art and Sci. XXV., pp. 123-165 (issued Sept. 25, 1890). From the author.

4028. A provisional host-index of the fungi of the United States, by W. G. Farlow and A. B. Seymour. Part II. Gamopetalae—Apetalae. Cambridge, Sept. 1890. From Dr. Farlow.

4029. Annual report of the State botanist of the State of New York. By Charles H. Peck, Albany, 1890. From the author.

4030. Report of the botanist on the grasses and forage plants, and the catalogue of plants. By Charles E. Bessey and Herbert J. Webber. Extracted from the report of the Nebraska State

Board of Agriculture for 1889. Lincoln, Neb., 1890. From H. J. Webber.

4031. Notes on slugs, chiefly in the collection of the British Museum. By T. D. A. Cockerell. From the Annals and Magazine of Natural History, October, 1890, pp. 277-288. From the author.

4032. Colorado College studies: papers read before the Colorado College scientific society. First annual publication. Colorado Springs, Colo., 1890. From the society.

4033. Bulletin of the Illinois State Laboratory of Natural History. Vol. III. Articles I to X. pp. 1-190 (separates).

4034. A protest against the Supreme Court of Illinois. By Edward C. Hegeler. Chicago, 1890. From the author.

4035. Catalogue of the described Araneae of temperate North America. By Dr. George Marx. From Proc. U. S. Nat. Mus., XII, 497-594. Washington, 1890. From the Smithsonian Institution.

4036. Notes on the leaves of Liriodendron. By Theodor Holm.

4037. Birds from the coasts of western North America and adjacent islands, collected in 1888-'89. with descriptions of new species. By Charles H. Townsend.

4038. Reptiles from Clarion and Socorro Islands and the Gulf of California with description of a new species. By Charles H. Townsend.

4039. Plants collected in 1889 at Socorro and Clarion Islands, Pacific Ocean. By Dr. George Vasey and J. N. Rose.

4040. On a new genus and species of Colubrine snakes from North America. By Leonard Stejneger.

4041. The osteological characteristics of the family Anguillidae. By Theodore Gill.

4042. The osteological characteristics of the family synaphobranchidae. By Theodore Gill.

4043. The osteological characteristics of the family Muraenidae. By Theodore Gill.

4044. On the disappearance of the dick cissel (Spiza Americana) from the District of Columbia. By Hugh M. Smith.

4045. Description of a new species of bat, Atalapha semota. By Harrison Allen.

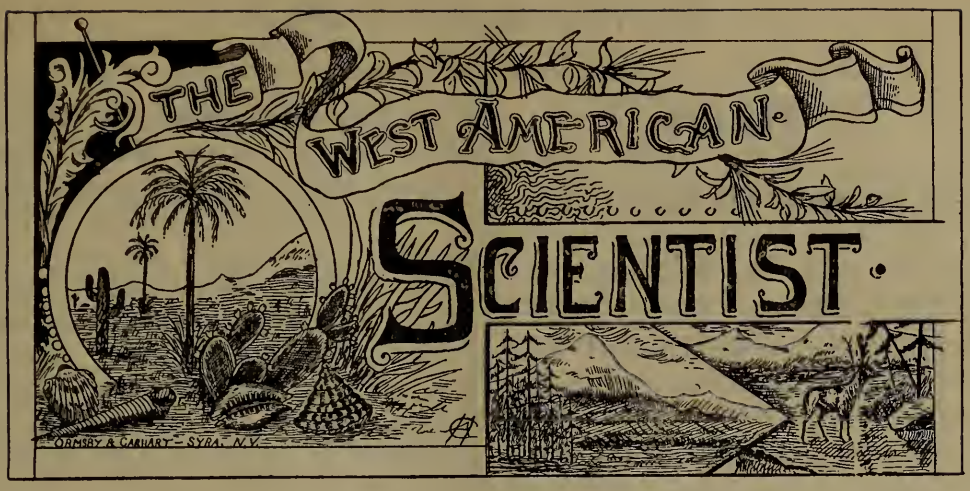
4046. On the snakes of the genus Charina. By L. Stejneger.

4047. On the North American lizards of the genus Barissia of Gray. By L. Stejneger.

4048. Notes on the occurrence of a young crab-eater (Elacate canada) from the Lower Hudson Valley, N. Y. By A. K. Fisher.

4049. Observations on the life history of the bottlenose porpoise. By Frederick W. True.

4050. Descriptions of new West American land, fresh water, and marine shells, with notes and comments. By Robert E. C. Stearns.



LITERARY AND EDUCATIONAL SUPPLEMENT, No. 3.

(*Edited by the Students and Facully of the San Diego College of Letters.*)

A POETICAL MOSIAC.

(Selected.)

Why all this toil for triumphs of an hour (*Young*)?
Life's but a summer, man a flower (*Johnson*).
By turns we catch the vital breath and die (*Pope*)—
The cradle and the tomb, alas! so nigh (*Prior.*)
To be is better far than not to be (*Sewell*)
Though all man's life may seem a tragedy (*Spencer*);
But light cares speak when mighty cares are dumb (*Daniell*);
The bottom is but shallow whence they come (*Raleigh*).
Your fate is but the common lot of all (*Longfellow.*)
Unmingled joys here to no man befall (*Southwell,*)
Nature to each allots his proper sphere (*Congreve.*)
Fortune makes folly her peculiar care (*Churchill.*)
Custom does often reason overrule (*Rochester;*)
And throws a cruel sunshine on a fool (*Armstrong.*)
Live well—how long or short, permit to Heaven (*Milton;*)
They who forgive most shall be most forgiven (*Bailey.*)
Sin may be clasped so close we cannot see its face (*Trench*),
Vile intercourse where virtue has no place (*Somerville*).
Then keep each passion down, however dear (*Thompson*),
Thou pendulum betwixt a smile and tear (*Byron*).
Her sensual snares let faithless Pleasure lay (*Smollett*)
With craft and skill, to ruin and betray (*Crabbe*);
Soar not too high to fall, but stoop to rise (*Massenger.*)
We masters grow of all that we despise (*Cowley.*)
Oh, then, renounce that impious self-esteem (*Beattie,*)
Riches have wings and grandeur is a dream (*Cowper.*)
Think not ambition wise because 'tis brave (*Davenant;*)
The path of glory lead but to the grave (*Gray*).
What is ambition? 'Tis a glorious cheat (*Willis,*)
Only destructive to the brave and great (*Addison.*)
What's all the gaudy glitter of a crown (*Dryden*)
The way to bliss lies not on bed of down (*Quarles.*)
How long we live, not years, but actions tell (*Watkins.*)
The man lives twice who lives the first life well (*Herrick.*)
Make then, while yet you may, your God your friend (*Mason.*)
Whom Christians worship, yet not comprehend (*Hill.*)
The trust that's given guard, and to yourself be just (*Dana,*)
For, live we how we can, yet die we must (*Shakespere.*)

——:o:——

WAITING.

By the mossy old stone wall,
From the trees the blossoms fall
Bright the starlight burns above,
While I'm waiting for thee love
Waiting, waiting,
In the golden even-tide.

By the mossy old-stone wall,
On thy grave the dead leaves fall;
Soft the starlight beams above
I am lonely waiting love
Waiting, waiting
For the golden even-tide.

Eulalie Woods.

At Home.

LOCALS AND PERSONALS.

We are glad to welcome back Theodore Barnes, a former student.

We have been entertained with some every excellent debates in the Literary Society, lately.

A short while ago we students made a visit to that place of historical interest, Old Town, sometime afterward, to take advantage of the extreme low tide, we walked along the beach to Point of Rocks. The coloring of the sea and glittering sands, the silvery, slender new moon and the gleaming evening star burning in a sky that still glowed with the glory of sunset could have been done justice only by the pen of Black. It is certainly true that the students in our college have the benefit of beauties of nature not to be met with elsewhere.

Miss Gover had an appreciative audience in her room, the other day, looking at some of her pictures—water-colors, designs, copper-plate etchings of Colorado scenery, paintings in oil, etc.

Last Friday in replacing officers in the Excelsior Society Miss Ida Lowe was chosen President; Henry Frey, Vice-President; Miss Belle Jacoby, re-elected Secretary; E. N. Groh, Chaplain; Misses Niles and Pease, Critics; the Executive Committee will remain unchanged for the term.

The College students under Prof. Davidson's care went on a picnic to La Jolla Caves, during the recent low tide to gather mosses, shells and information.

A Fox always is a sly creature, and Lewis was true to his name in the management of his debate of last week. By-the-by it was a *very* good debate.

The West is making great strides in educational matters. All who wish to understand the great subject of education as it affects America must keep *en rapport* with our western country. One of the western schools has a travel class which visited Washington recently. Travel classes, if managed properly, must have distinct effect upon culture. The Englishman who, in Chesterfield's time, scrupulously sent his son on the "grand tour," and the young German of Goethe's time who "finished" with a "wander-year," understood this.

The teacher of Art, Miss M. E. Gover, from London, has exhibited in all the principal exhibitions in England, among which are the Royal Academy of Fine Arts, London; the Institute of Painters in Water Colors, Picadilly, London, and the Society of British Artists, Certificated as Art Master at the South Kensington School of Design. She also holds certificates with honors, from the Trinity College, London. Since she has been in America her line of work has been etching, chiefly from western scenery.

EDITORIAL.

The *Illini*, the old college paper of the University of Illinois, this fall, enters on its twentieth volume. The *Illini* grows and improves with the institution with which it has so long been identified. In its issue of September 27th, the *Illini* said:

A fact ever to be borne in mind about the College of Letters is the salubriousness and healthfulness of the climate and location.

Not only do those who are in good health, or entering college retain their health, but invalids of other climes and localities attend school at Pacific Beach, able to live comfortably, pursue their studies, and constantly gain in health.

'Tis always morning, somewhere and above
The awakening continents, from shore to shore,
Somewhere the birds are singing evermore.

—*Longfellow.*

School and College.

SCHOOL AND COLLEGE.

The Westfield, Mass. High School is to organize an Agassiz Science Club.

A party of students of California College, Oakland chaperoned by a professor, lately paid a visit to their noted neighbor, Joaquin Miller, "The Poet of the Sierras." who has his characteristically odd home in the hills of East Oakland, or on what he calls "Oakland Heights." Like other notables, the blond old singer of the mountains, is intruded upon by a great many gaping sight seers, who go to look at him as they would some abnormal curiousity in a noisy side show to a menagerie. So this party found Joaquin too much indisposed to receive them as he preferred the role of an interesting invalid to that of a (mountain) lion. Mr. Miller is excentric or nothing. A few years ago while making his home temporarilly in Washington, D. C., he perched his "cabin" in the prongs of a tree and had the distinguished people who would run after him, climb a ladder to gain his latch string.

English universities derive only one-tenth of their support from students, while the students of American Colleges contribute two-fifths to their maintainance.

A number of the students of the university of Kansas have formed a "Modern Language Club." All the business correspondence, conversation and exercises of the meetings are to be conducted in the language to which the session of the Club is devoted—French, German, etc.

The university of Illinois has 450 students. 177 of them being new ones, this fall.

The university of Moscow is 135 years old, and has 88 regular professors, 85 private instructors and 3,805 students.

NOTES AND NEWS.

The debate is the Society grindstone.— *Whittenberger.*

The tunnel under St. Clair river, between Canada and the United States is completed, and soon will be opened with a "hole" lot of ceremony.

A thirty-four mile $40,000,000 tunnel is proposed now, between Ireland and Scotland. An eight or ten year job.

A cheap luminous paint is now in use in Germany, designed for painting cellars, railway tunnels, dark rooms, etc. It is now produced in various colors, white, red, blue, yellow, etc , at a cost of about seventeen cents to the square yard of wall.

"It is not intellectual work that injures the brain," says the London *Hospital*, "but emotional excitement. Most men can stand the severest thought and study of which their brains are capable, and be none the worse for it, for neither thought nor study interferes with the recuperative influence of sleep. It is ambition, anxiety, and disappointment, the hopes and fears, the love and hates of our lives, that wear out our nervous system and endanger the balance of the brain."

Mr. Kessler, Chief Forest Master in Germany, makes the striking comparison that the United States has only 11 per cent. of its area covered by forests, while of the entire German empire there are 26 per cent. of area covered.

"Woodman spare that tree!"

Dr. Koch's cure for consumption is a healthy medical fad, just now. Medication is said to be by the injection, of "lymph," under the surface of the body.

Whales are becoming scarce and whalebone is $10,000 a ton. Perhaps raising whales is to become an industry, like that of raising buffaloes. Buffalces not very long ago clouded the plains of this country. In the November *Century*, Gen. John Bidwell, one of our interesting pioneers, writes of the buffalo of only about

forty years ago:

I think I can truly say that I saw in that region in one day more buffaloes than I have seen of cattle in all my life. I have seen the plain black with them for several days' journey as far as the eye could reach. They seemed to be coming northward continually from the distant plains to the Platte to get water, and would plunge in and swim across by thousands — so numerous were they that they changed not only the color of the water, but its taste, until it was unfit to drink; but we had to use it. One night when we were encamped on the South Fork of the Platte they came in such droves that we had to sit up and fire guns and make what fires we could to keep them from running over us and trampling us into the dust. We could hear them thundering all night long; the ground fairly trembled with fast approaching bands; and if they had not been diverted, wagons, animals and emigrants would have been trodden under their feet.

Bret Hart, who is growing old and white-haired, is living in England, where he is still quite popular.

Among the new exchanges is the WEST AMERICAN SCIENTIST, published at San Diego College of Letters, Pacific Beach, California. The paper is divided into two departments, a scientific, and a literary and miscellaneous. It is published monthly. The scientific department of the August number begins with a review of the life and services of Mathew Cook, a prominent western naturalist whose investigations of the Codlin moth and other insects injurious to fruit attracted considerable attention. An article on "The Beach and Its Effects on the Climate," and another on "The Coloration of Fishes," are also of special interest. An article on the flora and fauna of that region is valuable to anyone interested in botany and zoology. The literary and miscellaneous departments contain useful and humorous articles which convey many valuable hints.

College of Letters.

FACULTY.

Samuel Sprecher, L. L. D., President.
F. P. Davidson, A. M., Natural Sciences.
Lucia Powers Woods, Languages—Ancient and Modern.
Thos. J. Penfield, A. B., Mathematics.
Mary Edith Gover, Art Master—Art and English.
Carl Vandal, Music—Violin, Piano, Vocal.
E. N. Proh, Asst. Instructor of Latin.
Katie Woodford and Lita Kidwell, Asst. Insts. Preparatory.

—:o:—

STUDENTS.

Alexander, Jesse, San Diego, Calif.
Ames, Nellie, Los Angeles, "
Barbour, Frank, Coronada, "
Barbour, Fred, " "
Barnes, Theodore, Madison, Neb.
Blakeman, C. B. San Diego, Calif.
Bottsford, Addie, La Jolla, "
Brown, Bessie, San Diego, "
Cogewell, Mary, Pacific Beach, "
Davidson, Charles, " "
Davis
Fox Lewis Colton, "
Frey, Henry H., Cincinnati, Ohio.
Gabrielson, Wm., San Diego, Calif.
Gearn, Laura, " "
Groh, E. N., Boyertown. Penn.
Hall, Maria, El Cajon, Calif.
Havermale, Wm., San Diego, "
Hewlet, Fannie, Cascade, Colorado.
Jacoby, Belle, San Diego, Calif.
Jones, C. Lily,
Kidwell, Lita, National City, "
Kirby, Edith, San Diego, Calif.
Lovett, Horace " "
Lowe, Ida, " "
Niles, Ruby, " "
Oliver, Jacqueline, Punta Banda, L. C.
Pauly, James, San Diego, Calif.
Pauly, Nettie, " "
Pease, Fannie, Valley Centre, "
Pease, Minnie, " "
Reed, Oliver, San Diego, "
Roper, Chas. Dublin, Ireland.
Roper, Samuel, " "

Rowe, Evangeline, Pacific Beach, Calif.
Rowe, Mabel, " " "
Stockton, Samuel, San Diego, "
Sprecher, James, " "
Suits, Rodney, " "
Thomas, Fred, " "
Thope, Lulo May, Pacific Beach, "
Thoustrup, Della, San Diego, "
Thoustrup, Rosa, " "
Thresher, Marian, Pacific Beach, "
Townsend Maud, Calico, "
VanNorman Vernon, San Diego, "
Wagner, Pearl, Pacific Beach, "
Wescott, Maud, " "
Wood, Harry, National City, "
Woodford, Kate, San Diego "
Woods, Eulalie, Pacific Beech "
Woods, Percival E. " "

CHILDREN'S LITERATURE.

Victor Hugo calls this 'the women's century,' and he might have added that it is the children's century as well, for never before the world's history has so much thought been paid to children—their schools, their book, their pictures and their toys. Childhood, as we understand it, is a recent discovery.

Up to the time of the issue of the *St. Nicholas Magazine* seventeen years ago literature and children's magazines were almost contradictory terms, but the new periodical started out with the idea that nothing was too good for children; the result has been a juvenile magazine genuine with conscientious purpose—the greatest writers contributing to it, with the best artists and engravers helping to beautify it—and everything tuned to the key-note of youth.

It has been the special aim of *St. Nicholas* to supplant unhealthy literature with stories of a living and healthful interest. It will not do to take fascinating bad literature out of boys hands and give them in its place Mrs. Barbauld and Peter Parley, or by the work or writers who think that any 'good-y' talk will do for children, but they must have strong interesting reading, with the blood and sinew of real life in it—reading that will waken them to a closer observation of the best things about them.

In the seventeen years of its life *St. Nicholas* has not only elevated the children, but it has also elevated the tone of contemporary children's literature as well. Many of its stories, like Mrs. Burnett's 'Little Lord Fauntleroy,' have become classic. It is not too much to say that almost every notable young people's story now produced in America first seeks the light in the page of that magazine.

The year 1891 will prove once more that 'no household where there are children is complete without *St Nicholas*.' J. T. Trowbridge, Noah Brooks, Charles Dudley Warner and many well-known writers are to contribute during this coming year. One cannot put the spirit of *St. Nicholas* into a prospectus, but the publishers are glad to send a full announcement of the features for 1891 and a single sample copy to the address of any person mentioning this notice. The magazine costs $3.00 a year. Address the Century Co., 33 East 17th St., New York.

A GREAT AMERICAN MAGAZINE.

The Century magazine is now so well know that to tell of its past success seems almost an old story. The N. Y. *Tribune* has said that it and its companion, *St. Nicholas for Young Folks*, issued by the same house, 'are read by every one person

in thirty of the country's population,' —and large editions of both are sent beyond the seas. It is an interesting fact that a few years ago it was found that seven thousand copies of *The Century* went to Scotland—quite a respectable edition in itself. The question in England is no longer 'Who reads an American book?' but 'Who does not see the American magazines?'

A few years ago *The Century* about doubled its circulation with the famous War Papers, by General Grant and others, adding many more readers later with the Lincoln History and Kennon's thrilling articles on the Siberian Exile System. One great feature of 1891 is to be 'the gold hunters of California,' describing that remarkable movement to the gold fields in '49, in a series of richly illustrated articles *written by survivors*, including the narratives of men who went to California by the different routes, accounts of the gold discoveries, life in the mines, the work of the vigilence committees (by the chairman of the committees) etc., etc. General Fremont's last writing was done for this series. In November appears the opening article 'The First Emigrant Train to California,'—crossing the Rockies in 1841—by General Bidwell, a pioneer of pioneers. Thousands of American families who had some relative or friend among 'the Argonauts of '49' will be interested in these papers.

Many other good things are coming—the narrative of an American's travels through that unknown land Tibet (for 700 miles over ground never before trod by a white man); the experience of escaping War-Prisoners; American Newspapers described by well-known journalists; accounts of the great Indian Fighters, Custer and others; personal anedotes of Lincoln, by his private secretaries; 'The Faith Doctor,' a novel by Edward Eggleston, with a wonderfully rich programme of novellettes and stories by most of the leading writers, etc., etc.

It is also announced that *The Century* has purchased the right to print, before its appearance in France or any other country, extracts from advance sheets of the famous Talleyrand Memoirs, which have been secretly preserved for half a century—to be first given to the world through the pages of an American magazine. All Europe is eagerly awaiting the publication of this personal history of Talleyrand—greatest of intriguers and diplomats.

The November *Century* begins the volumne, and new subscribers should commence with that issue. The subscription price ($4.00) may be remitted directly to the publishers, The Century Co., 33 East 17th St., New York, or single copies may be purchased of any newsdealer. The publishers offer to send a free sample copy—a recent back number—to any one desiring it.

SCIENCE FOR YOUNG PEOPLE.

The *Youth's Companion* of Boston the well-known weekly, filled with choice stories and miscellany, announces for 1891 an interesting and instructive series of papers by eminent scientists on the latest discoveries in science.

Among the subjects are, 'The Stars,' 'The Moon,' 'The Earth,' 'The Ocean,' and 'The Sun.' 'The Trappers and Hunters of the Insect Tribes,' by Dr. H. C. McCook, is sure to be especially fascinating to the naturalists old and young. Subscription price, $1.75 per year in advance, for this unique journal.

Among the Wits.

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A watch factory can't run on tick any better than any other factory can.

The r-oystering months — the months with "r's" in them.

Many a poor man with a large family has found that any number of dogs will not keep the wolf from the door.

Work educates the body—*Coleridge.*

How ignorant a tramp's body must be.

Little Dot—"Mamma, what does 'transatlantic mean?" Mamma—"Across the Atlantic of course." Little Dot—"Does 'trans' always mean 'across'?" Mamma—"Yes. Now don't bother me any more, or I shall put you to bed." Little Dot—"Well, Mamma, does 'transparent' mean a cross parent?"

Young Humorist (to the editor)—Have you looked over the comic sketches I left with you?

Editor—I have.

Young Humorist—They ain't as good as I might do if I hadn't so many other irons in the fire.

Editor (handing back the manuscript)—Here they are and I advise you—

Young Humorist—What?

Editor—Put them with the other irons.—*Texas Siftings.*

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Water the heart with culture and grace;
Keep the fires of conscience burning,
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And scripture says it you do,
You're "greater than he that taketh a city."

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MAY 26 1891

EDWIN WORTHAM DORAN.

Well-directed and sustained effort is always followed by success. Many times a varied preliminary preparation, with its broadening educational influence, is necessary to enable one to properly directed effort; but when one is blessed with a reasonable amount of talent, a large quantity of tact, together with a good education, such an one is expected to arrive at distinction.

Edwin Wortham Doran, son of Samuel C. and Eliza A. Doran, first saw the light April 28, 1856, in Grayson county, Kentucky. When Edwin was four years old his parents removed to Coles county, Illinois, and purchased a farm five miles north of Mattoon. His school life began at the age of eight, attending the district school about three months each year until he was nineteen, when his course as a teacher began. He taught in the district schools of the vicinity winters, farming during the summers, at the same time pursuing, independently, the study of the natural sciences and reading some Latin. In this manner he was enabled to obtain information necessary to secure a first grade teacher's certificate.

Mr. Doran began a course of study at Lincoln (Ill.) University which was interrupted from lack of funds. Later he attended Westfield (Ill.) College where he spent some time, and afterwards he read law for some months. But a change having been made in his religious views, after some preliminary preparation, he began to preach, receiving a license to do so from the Vandalia Presbytery of the C. P. Church. In that line of work he gave

promise of ultimate success, and was encouraged to continue by eminent divines. But he could not give up school work, though he continued to preach occasionally, and is now regularly ordained. He attended normal institutes in various parts of the State, usually being placed in charge of some department of instruction, and in every possible manner specially prepared himself for a higher sphere of educational labor.

In the early part of 1884 Prof. Doran was elected General Secretary of the Y. M. C. A., at Mattoon, resigning later to accept the principalship of the Ancona (Ill.) Public Schools. At this time he occupied his leisure moments in the systematic study of entomology under the direction of the writer, acquainting himself with entomological literature and rearing and classifying insects. The following year he was associated with a brother at Edwards Academy, White Pine, Tennessee. Later he was placed at the head of London (Tenn.) College, soon afterward becoming a benedict. He was married December 31, 1885, to Miss F. E. Beale, of Humboldt, Ill., an accomplished musician. During the year he continued his entomological studies, prepared popular articles for the press, and delivered addresses on economic entomology before various agricultural gatherings. These labors soon attracted public attention. November 18, 1885, he was appointed State Entomologist of Tennessee by Commissioner McWhirter, and during his incumbency of nearly three terms he has formed a collection of the insects of the State, published one valuable report, many bulletins, a catalogue of the Insects of the State, and prepared a second report which is soon to be published. These publications have been reviewed by various critics and always mentioned with commendation.

While State Entomologist, Prof. Doran occupied the following positions consecutively: Professor of Natural Sciences in Cumberland Female College, Monteagle Summer School of Science, and Bethel College. As an instructor his reputation has steadily increased and the best positions in the State were open to him.

For a year he conducted a department of entomology in the *Spirit of the Farm* in which he gave, weekly, the results of his investigations in Tennessee entomology. In August, 1890, he resigned his office to accept the professorship of Natural Sciences in Pritchett Institute, Glasgow, Missouri, where he now resides.

In 1887 he received the degree of A. M., from Grant Memorial University, Athens, Tenn., and of Ph. D. in 1890, from Cumberland University, Lebanon, Tenn.

In personal appearance Prof. Doran is rather under size, of slight figure, medium complexion, and sharp penetrating brown eyes. He is active, nervous, and rapid in his movements and thoughts.

While State Entomologist of Tennessee, Prof Doran did some grand good work in an almost unknown field, which will be greatly appreciated by those who follow in his footsteps, and

should the office be continued—and it now appears that Professor H. E. Sommers, of Knoxville, Tenn., will succeed him—his successor will find a good groundwork upon which to erect a substantial superstructure. *F. W. Goding.*

STAR TULIPS.

(From the Pacific Rural Press, XXXIX. 11.)

Though they belong to the same genus, Calochortus, the Mariposa or Butterfly Tulips, and the Star Tulips are distinct enough in general appearance to be thought quite separate. While the Mariposa Tulips are marked by a stiff, erect stem, and erect cups of flowers, brilliantly colored, the Star Tulips have a drooping, flexuous habit, and flowers more delicate in form and color than brilliant. In these attributes, delicacy of flower and grace of form, the Star Tulips are excelled by no other flower in cultivation. The general appearance is similar to the well-known snowdrop. They have only one leaf, a glossy green, lance-shaped leaf, often a foot long, proceeding from the bulb. The flowering stem is slender and drooping, branched in most species into many flower pedicels, with no leaves, and the bracts often colored like the flowers. The strongest growing species are as much as a foot high, in good specimens, while some of the small species are at perfection at three inches. Most of the species find their most congenial home in Woodland.

In describing the species they can best be grouped. Calochortus albus and C. pulchellus are strong growing species, bearing numerous blossoms. The petals curve together and close, forming a flattened globe, which hangs pendalous. On the exposed edges of the petals is a fringe of silky hairs. The blossom of C. albus is of a pearly white. The inside is filled with silky white hair. It has sometimes been called the 'Lantern of the fairies.' A well-grown plant of this species will bear from ten to twenty or thirty flowers, one to two inches in diameter.

Calochortus pulchellus differs from the preceding in its blossoms being a golden yellow and hardly so large. Both species grow in dry, loose soils in open woods and are easily cultivated.

In another group can be placed C. Benthamii, C. maweannus, C. elegans and C. coeruleus. In all of these the average specimen is quite low and the flowers wonderfully delicate. A well-grown specimen is three to five inches high, but the single root leaf is often much longer. The slender flower stem bears a few pendulous, open, bell-shaped flowers, filled with long silky hairs. All are plants of the cool woodlands. C. Benthamii is golden yellow, the others white to blue, and filled with hairs of the same color.

In my last group of Star Tulips I would place a few species of plants growing in wet places, having the same long, glossy root leaf, but a stouter, more erect stem, and open, cup-like flowers in

solid colors, and but slightly hairy. These are C. Tolmii, with lilac flowers, and stem a foot high; C. nudus, with white flowers, a few to ten inches high; C. lilacinus, with pale lilac flowers, a strong grower; and C. uniflorus, with lilac flowers, and low.

In cultivation most of the Star Tulips will do well in a clay or sandy loam with a little mold, and dryness, shade or moisture, as I have hereinbefore indicated. *Carl Purdy.*

EASTER ISLAND.

(From the Washington, D. C., *Star*, July 27, 1889.)

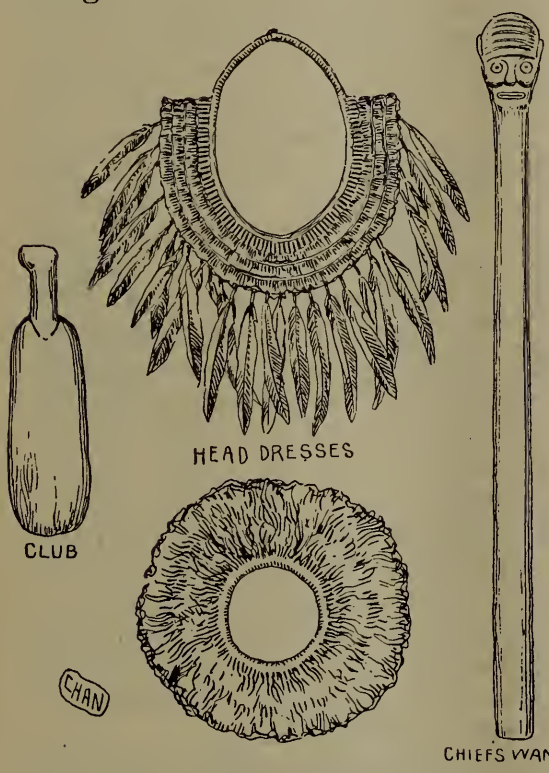
THE hideous stone images and carvings in stone and wood at the U. S. National Museum attract attention to the curious people who inhabit the Easter Island. The island was the home of the image makers, and the products of their skill and imagination are emblems of hideous idolatry. Paymaster Thompson gives an interesting description of these curious people and their relics. It is doubtful, he says, whether the present race are descendants of the image makers. He is inclined to think that there was an earlier prehistoric race. One of the most noteworthy facts discovered through their archæology is that they had a written language.

The collection from Easter Island includes images, stone and wood carvings, stone spear heads, various implements, weapons and utensils of industry illustrative of the 'civilization' of the people. In his description of the relics of the Easter Island collection Mr. Thompson states that it does not appear that the ordinary stone and wooden images, in which the island abounds, were in any sense idols. They seemed rather to be erected as our bronze is erected in the parks, to commemorate individuals.

Be this as it may, the visitor at the National Museum must be strongly predisposed to look upon these monstrosities in carving

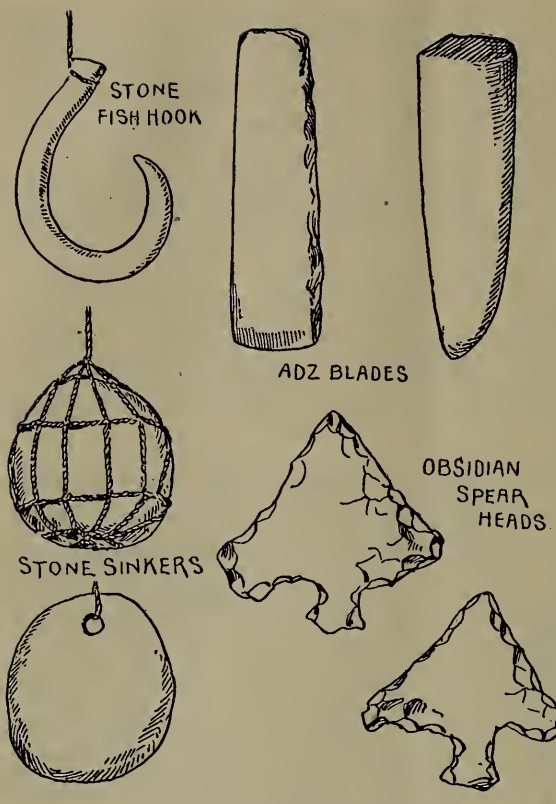
as the idols of a heathen race. The wooden images are of comparatively recent date. They are divided into three classes—the male, the female and the ribbed. The stone images are very rudely carved and are of earlier date than those of wood.

There are three stone idols, however, of higher rank than these—nothing less than that of stone gods. These are the fish god, called by the natives '*Mea Iku;*' the bonit's god, called '*Mea Kahi;*' the fowl god, called '*Mea Moa.*' These are all ill-shaped and apparently without distinguishing characteristics, but they are considered worthy of worship by the natives. While the various other images were intended as effigies of chiefs or other persons of importance, these received a profound religious homage.



These gods were never common and were possessed by communities or clans, and never by individuals The legends all claim that they were brought to the island by the first settlers. An especial god being set apart for the bonits, as distinct from the other fish, is attributed to the fact that fish has always been abundant and highly prized as food. Fish always constituted an important article of diet with the natives, and the abundance in which they were found is ascribed to the faithful and constant adoration to the stone fish gods. The fowl god was believed to ward off evil influences by being placed at night near where the chickens were accustomed to roost. It was moved about from one house to the other as the necessity for its services was felt. These stone gods show no attempt at carving in their construction.

The primitive sinkers and fishing hooks of these islanders shown in the collection are of stone. Some of the sinkers are fastened in a network of twine, while others are attached to the fishing line by means of a hole bored in the stone. The hook is a crude sort of contrivance, forming about three-quarters of a circle, the security of the hold when a fish is caught depending upon the inward turn at the point. The manufacture of one of these hooks was an immense labor. Other hooks are made of a man's thigh bone. Tradition on the island describes how the



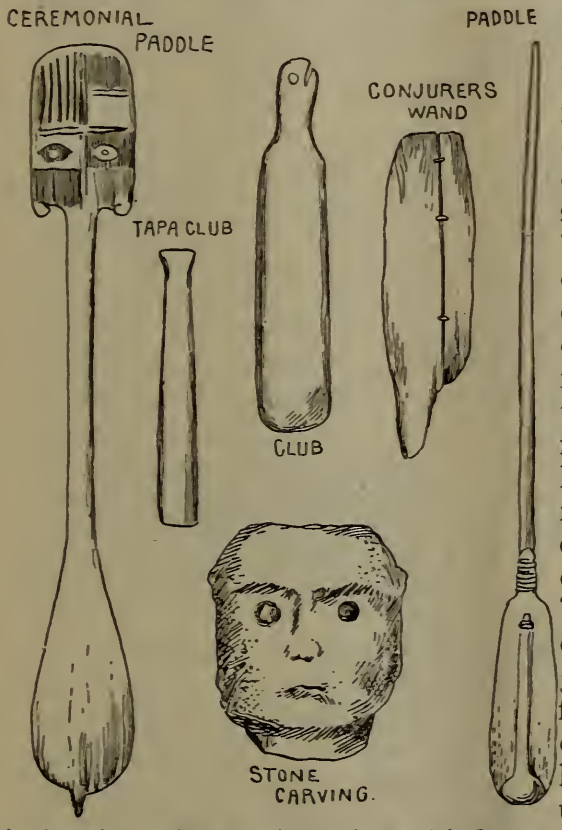
first bone hook happened to be made. In the prehistoric period of the image makers a youth named Ureraius was apprenticed to a fisherman of Hauga Pico. After having mastered the profession he obtained a canoe and went regularly into the business for himself. Somehow he was not successful. He worshipped the fish gods diligently, but his prayers and devotion failed to give him luck. The finest fish escaped him. *Mea Ika* and *Mea Kahi* seemed offended at him. On one occasion, after a period of particularly bad luck, he determined to pray all night by the god *Mea Kahi*. At midnight, while still at his devotions, the spirit of an ancient fisherman named Tirakaka appeared and told him that his ill-luck was due to the imperfections of his hooks. The spirit told him to go to the tomb and get a piece of thigh bone from the remains of his father, and to construct a hook of this bone. The young fisherman was much frightened, but he went to the cave the next day and got the thigh bone. For many days the time usual with him for fishing was spent in labor on the construction of this 'enchanted' hook. His friends thought he was fishing, and they used to ridicule him because he bronght home no fish. He took this with more complacency than the modern fisherman receives such taunts, for his moment of triumph was near.

When he finished his hook he sought a place distant from his companions and in a few minutes had his canoe full of fine fish. The extraordinary success of the youth caused many questions to be asked of him and provoked jealousy, but he refused to impart his secret. His stubbornness led to serious quarrels and finally an attack was made upon him to force the secret from him, and in maintaining it he lost his life.

In the manufacture of these bone hooks the material used is invariably the thigh bone of an old fisherman. They are provided with barbs and are cunningly contrived.

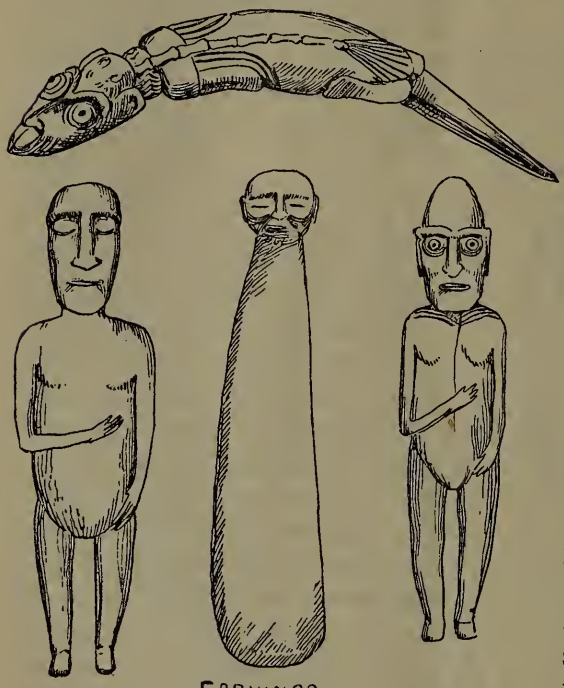
The stone axes of the Easter Island are made of hard slate—black, red and gray—called maca toke. Granite is used also for axes. The hardest and finest stone implements are made of

the flinty beach pebble, known as maca keng-rengo. The images were constructed of a stone called maca matariki, and the obsidian, from which the spear heads were made, is known as maca mataa. The spear heads of obsidian were roughly chipped and varied in form. Nine different forms are given by Mr. Thompson, some of which are strikingly like in shape to the old battle-axes of our early ancestors. These stone heads were lashed on shafts eight feet long and formed the chief weapon of the ancient islanders. They were thrown at a distance as well as used to thrust with. These spear heads were got chiefly from old tombs and caves. A few were found on old battle grounds. Tradition imparts that the use of these stone spear heads was brought about by an accident. The natives used to make ineffective war armed with spears with heads of dried calabash. On account of the character of the weapon they used to fight long and desperately without much result. A man returning from a hard and fruitless battle stepped on a stone that cut his foot. He carried the stone home and discovered it to be a material suited for spear heads. Weapons were at once made with points of this material and the enemies of the clan were quickly routed. Clubs from four to six feet long made of heavy wood are another class of weapon or baton shown in the collection. The points of the clubs of one class are slightly widened, and the handles are ornamented with double faced images. These were the batons or badges of office of the chiefs, and the handles were supposed to represent the effigy of the owner of the club or one of his illustrious ancestors. The clubs used as weapons of defense were from 20 to 30 inches in length and from the handle are widened out into a broad heavy blade. They were used with great dexterity in battle. A wand carried chiefly by the women in their dances has upon its flattened side the effigy of some woman noted for her grace and skill in dancing.



The hats of the Easter Islanders were crownless. They wore headdresses of feathers for ornament and to shade the face, perhaps. The collection shows six different styles. They are made

of chicken feathers, secured by the quill end to a foundation of knitted hemp, intended to fit around the head closely. The hat worn by the dancing women is small and narrow with fine feathers of bright color overlapping all the way around. The hat worn by married women upon the occasion of a ceremony connected with a betrothal is large and broad, made of black feathers about six inches long, clipped evenly all the way around. The men at their food feasts wore a small hat of feathers with long tail feathers hanging behind. The hat of the chief worn as an insignia of office is very large and heavy, the front made of short feathers set up on end and clipped evenly like a garden hedge, and the back ornamented with the largest and finest tail feathers to be had. The minor officials and chiefs ex-officio wear a lighter hat, made of short black feathers, with four tail feathers on end and tending outward at regular intervals. These headdresses are highly regarded by the islanders.



CARVINGS

From an early period the natives of the Easter Island have used large fish nets, which are very well made of wild hemp. The nets used for fighting purposes and the strong ropes used in handling the gigantic stone images were made of this wild hemp. Wooden needles, called hika, were used in making the nets. The paddles used by the Easter Islanders for their canoes were eight feet long, made with double blades, frequently decorated with carving or painted heads, and for superstitious reasons made of drift wood whenever it could be had.

Two curious relics are the fetish boards. The '*timoika*,' or ordinary fetish board, is a broad flat paddle made of bone, 14 inches broad and 30 inches long. It is supposed to possess rare powers in working a charm upon an enemy. The individual working the charm performs a convulsive sort of dance, making mysterious movements with the wand and muttering incantations in a monotonous tone. Such a charm is supposed to bring speedy death upon its victim.

A special potato fetish called '*raha*' has ascribed to it the power to protect the potato crop from insects, drought and evil spirits that might be interested in the injury of the crop.

These fetish paddles are only 24 inches long, with a blade at each end, and are painted a bright red.

The baskets and mats of the Easter Islanders were made of bullrushes. The mats are used to sleep upon.

Mr. Thompson secured two inscribed tablets of wood inscribed with hieroglyphics. These give to the island an especial interest as showing that the image and platform makers possessed a written language. These tablets are in a good state of preservation, and were supposed to be the only perfect ones to be found on the island The larger one is believed, from its shape, to have formed at one time a section of the side of a canoe. These tablets were common on the island until a few years ago, when Catholic missionaries, through excessive zeal, had them destroyed. The characters carry their signification in the image they represent, and the manner of reading them is to begin at the left hand lower corner on the particular side which will bring the figures erect. Finishing the lower line with the figures turned toward the reading, and going to the next line above, the reading is continued from right to left. In order to have the images face the same way it is necessary, in reading a new line, to turn successively the right side of the tablet to the left. Arriving at the top of the first face of the tablet, the reading is continued just over the edge to the nearest line at the top on the other face. The tablets vary in size from a few inches to four or five feet in length. The hieroglyphic characters are about half an inch in height, and are beautifully engraved in regular lines. The engraving is supposed to have been done with sharks' teeth. The native traditions about these tablets are very doubtful, simply asserting that the first king possessed the knowledge of this language, and brought with him to the island sixty-seven tablets containing allegories proverbs and traditions, relating to the land from which he came. A certain number of youths from each clan were instructed in the reading of these tablets, and once a year the people assemble to hear them recited. This was regarded as their most important fete day. These tablets are of undoubted antiquity. Some of the oldest platforms and

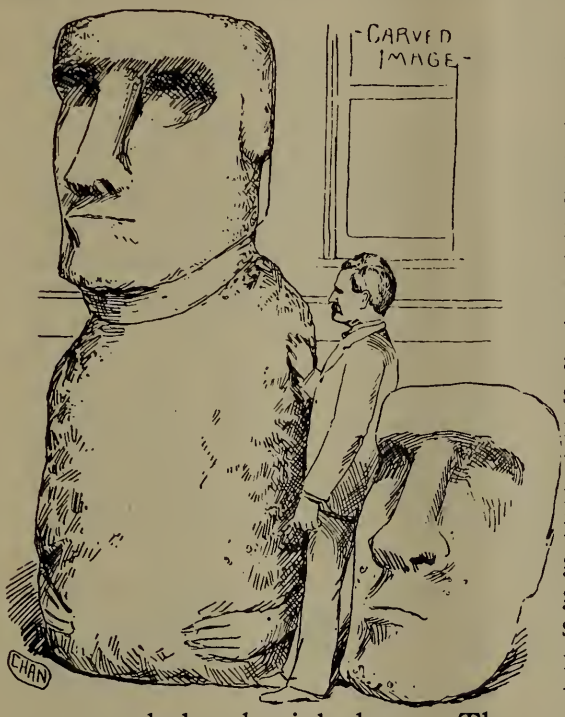
the door posts of some of the ancient stone houses are inscribed with hieroglyphics that appear occasionally upon the tablets. The tablets secured by Mr. Thompson were, one 9½ inches by 3½, and the other 24½ inches in length by 4½ in width.

The houses found on the island were of the most primitive style of architecture, built close together in parallel streets, facing the sea. They are built of small slabs of stratified rock, piled together without cement. They are not of uniform size. The average interior measurements would be about 14 feet in length by 6 in width, but a few were found of double that size. The walls are about 5 feet thick and the roofs are composed of long flat slabs of granite upon which mounds of earth have been piled. They have no windows and the doorways are on a level with the ground and so small that it is difficult for a large man to gain an entrance. The distance between the floor and roof is about 5 feet 2 inches, and the interiors are generally lined with slabs, upon which are painted figures of birds and animals.

The natives who occupied these houses were small of stature and the contracted entrances are believed to have been designed as a protection against their enemies.

The most important sculptured rocks were found in the vicinity of these houses. The hard rocks are cut to represent human faces, figures, birds, fish, and animals. These sculptured rocks are very much decayed by time and they are evidently more ancient than the houses. One figure, reproduced upon almost every rock, seemed to be half human and half beast, with bowed back and long claw-like legs and arms. Some slabs taken from one of the houses which was torn open represented some sort of marine animal with a bird's head and beak. Another represents the same sort of an animal with another head. Another represents the animal with two heads, turned toward each other. The natives say there is a significance in the position in which these heads are placed. A number of roof and wall slabs were taken from these houses carved with nondescript figures. Some ancient skulls were found among the ruins with mystical figures carved on them. These were supposed to have come from the king's platform. The workshops where the great stone images were

made were in the craters of the volcanoes where the stone was had.



The present race upon the island is almost extinct. It is said that at one time there were 20,000 people there. At present there are 155 natives on the island, who are supposed to bear relationship to the Malays. The interest of the place is in its relics of antiquity, its tablets preserving a written language in hieroglyphics, and in the immense stone 'platform' and gigantic stone images, which are found in great numbers and are of great antiquity. Mr. Thompson found 113 of these platforms, the largest of which was 150 feet long. These are regarded as burial places. They are rude structures of stone, varying in height, not above 9 feet and very long and narrow in form. Upon these were placed the gigantic stone statues. On the largest platform were found 15 of these images. This platform was 150 feet long, 9 feet high and 9 feet wide. With the original wings it would have been 540 feet long.

The images on these platforms are regarded as effigies of chiefs or distinguished persons. Some 552 of these images were found by Mr. Thompson and his party. The largest of these was 70 feet high.

ANCELLA-BEARING STRATA OF OREGON.

The genus Ancella belongs to the family Aviculideae. The species have recently been discussed at considerable length and a few notes at this time on the Ancella-bearing beds may be of interest.

The genus is of wide distribution, extending in the northern hemisphere from far within the Arctic circle to north forty-five degrees north latitude in Asia, and as far south in California as the thirty-fifth degree. The genus has also been recorded from two localities in the southern hemisphere.

The distinguishing feature in the genus is the short and peculiarly infolded anterior ear. It somewhat resembles Lima and Inoceramus, but lacks the transversely grooved hinge area and prismatic structure of shell of the latter genus. The numerous

described forms pass from one to another by such insensible gradations as to render it doubtful whether we have in southern Oregon more than one true species.

The Ancellas are generally distributed through the sandstone and limestone in the vicinity of Riddle, Oregon, at an elevation of about 2,500 feet—the lowest exposure known in this section. The rock is extremely hard, with a metallic ring, sometimes almost wholly composed of fragments of these shells, none of which are found entire. The exposures of these shell-bearing limestones are water-worn in appearance, the beds full of pot-holes, grooves and channels, like the bed of some mountain stream at a low stage of water, where the rocks are unequal in hardness and unequnally worn by the running water.

This exposure is about three miles west of Riddle, about three hundred feet above Cowcreek valley, on the crest of a considerble ridge with a deep gorge on either side. If running water caused the erosion noted it must have been at a very ancient date. The sandstone for some distance around contains numerous shells, imperfectly preserved.

Above these exposures are vast bodies and huge cliffs of conglomerate, composed entirely of quartz pebbles. Adjoining and usually above the conglomerate are the nickel mines and the country rock known as olivine, with large masses of serpentine and chromite in many places. Seven miles further west on the top of Big Buck mountain beds of coarse, soft sandstone occur, containing usually only the casts of these shells.

The Ancella-bearing strata of Alaska and British Columbia are considered of the Cretaceous age. Some of the beds in California have been referred to the Jurassic. Riddle is about twenty miles south of Roseburg, on the Oregon division of the Southern Pacific Railroad. The shells in the exposure nearest Riddle, where they are most abundant, resemble those from near Knoxville, California. The shells from Big Buck mountain are allied to A. erringtoni; some from the east of Riddle appear to be be A. piochii, while others look like A. pallassii.

Fine impressions of fern leaves occur in a shale of the carboniferous (?) age not far beneath the shell-bearing sandstone.

Aurelius Todd.

A NEW RHAPHIOMIDAS FROM CALIFORNIA.

The Dipterous genus Raphiomidas was founded by the Baron Osten Sacken (Western Diptera, page 281), who placed it in the family Midasidæ. No mention of this genus is made by Dr. Williston in his excellent 'Synopsis of the Families and Genera of North American Diptera;' in his Table of Families (l. c., pages 9-15) it would fall into the division (26) which contains the Asilidæ and Midasidæ, agreeing nearest with the characters accorded to the latter but differing in that the labella are not distinctly fleshy and the antennæ lack the terminal lamella. From

the characters accorded this latter family (l. c. page 33) the genus Rhaphiomidas further differs in that the third antennal joint is no-composed of several segments, and the ocelli are sometimes prest ent. Still this genus has evidently more affinity with the Midasidæ than with any other family.

The only described species, Raphiomidas episcopus, Osten Sacken, occurs sparingly in Los Angeles county in midsummer, hovering over flowers like a humming-bird. Only the female was known to Osten Sacken; the male agrees in all respects with his description of the female (Western Diptera, page 282) except that the last three abdominal segments are destitute of black pile; in both sexes each abdominal segment is bordered posteriorly with yellowish. In perfect specimens the proboscis is not cleft, as stated in the generic diagnosis (l. c. page 282), and the marginal cross-vein between the end of the anal cell and the tip of the wing is present in all of my examples.

While on a collecting trip in the northern part of this (Los Angeles) county in July last, I captured a singe male specimen of a species closely related to the above, but clearly distinct. As it will be easiest recognized by showing in what respects it differs from episcopus, I give the following comparison between these two species:

Rhaphiomidas Acton N. Sp.	Rhaphiomidas Episcopus, O. S.
Lower edge of third antennal joint much less convex than the upper edge.	Lower edge of third antennal joint as convex as the upper edge.
Apex of third antennal joint destitute of a tubercle.	Apex of third antennal joint provided with a distinct tubercle.
No ocelli present, their places occupied by sunken, not shining spots.	Three convex, shining ocelli present.
Bristles of posterior angles of thorax and of scutellum yellow.	Bristles of posterior angles of thorax and of scutellum black.
Abdomen shorter than the wings.	Abdomen half the length of the hypopygium longer than wings.
Abdomen orange-yellow, base of first two segments and a medio-dorsal spot at the base of the other segments black.	Abdomen black, posterior margin of each segment yellowish.
Segments 5, 6 and 7 together not longer than the third.	Segments 5, 6 and 7 together much longer than the third.
Aypopygium two-fifths as long as the abdomen.	Hypopygium one-fourth as long as the abdomen.

Macrochaeta of legs wholly yellow.	Macrochaeta of legs largely black.
Eyes in death deep green.	Eyes in death dark brown, with a purplish tinge.
Length, excluding the proboscis, 22 mm.	Length, excluding the proboscis, 27 mm.
Expanse, 40 mm.	Expanse, 46 mm.

D. W. Coquillett.

ICE CAVES.

(Written for the Oregon *Naturalist*.)

Caverns in recent lava flows are often observed by travelers. In the neighborhood of Mt. Adams, in Washington, there are some singular caves in basalt which were lately described to the writer by a friend who has visited them and who offers the following explanation of their formation. One of these possessed the unusual features of a fine supply of the purest ice, hanging in great pillars from the roof of the cave, and swelling out in great masses from the sides. These caves are quite numerous in the region drained by the upper waters of the White Salmon river. Years ago sufficient ice was obtained from one of these to supply the city of Portland, Oregon, the ice being packed on mules to the Columbia river, and thence by steamer.

A curious fact was observed, that the ice was formed in the spring and not in the winter season. These caverns are long passages through which lava once flowed in diminished volume after an eruption. In some of these passages the opening through which the lava entered the chamber would become choked up, or the flow otherwise interrupted or diverted into another channel, and the liquid portion remaining would then flow out, leaving an empty chamber. Some of these passages extended from the crater above to the plains below, and such are the ice caves according to the following evidence.

First, the unquestionably volcanic character of the cave examined, with its ropy masses of hardened lava, all trailing in the direction of the lava flow.

Second, a cold, freezing wind escaping from the mouth of the cave, cold enough at night in August to freeze.

Third, the observed fact that the ice cut away was replaced in spring and early summer, through April, May and June

The lower opening being in a warmer atmosphere than the upper opening, causes a downward draft through the passage of cold air, which, it is obvious, freezes the water trickling from the sides and roof of the passage as it passes.

THE FOREST TREES OF OREGON.—I.

(From *Resources of Oregon*)

There are two directions in which economical botany may find with the public special interest: One, the need of timber for commerce and in manufacture; the other, the home demand for shade trees and landscape gardening. For both of these lines of demand, that Oregon is well endowed may be seen in even a brief enumeration of the native trees suitable for these objects.

Beginning with the demands of our market, we place first on our list of timber the pines. The principal of these is the Sugar Pine (Pinus lambertiana.) It is at home along the northern slopes of the Siskiyous, is fairly abundant along the line of the Oregon & California railroad near Grant's Pass. It is also very fine and very abundant on the foothills of the Cascades that overlook Klamath Marsh. The timber is not inferior to that of the white pine of the eastern slope of the continent. The tree is large, often growing to the height of 150 to 175 feet. It bears a large cone, often 15 to 17 inches in length, suspended from the extremities of the limbs and therefore scattering. The timber of this sugar pine is highly prized for finishing, scarcely distinguishable from the best eastern white pine.

Another pine, the Pinus ponderosa (Oregon yellow pine), flourishes in many regions, a good marketable timber in and out of Oregon. It is abundant in central Oregon from the Dalles along the eastern slopes and foothills of the Cascade mountains and southward into Lake county. It is met with seldom in the Willamette valley and is there of inferior quality for timber Farther south one meets it more frequently. It is quite abundant on the eastern slopes of the Cascades throughout Oregon and Washington, and in many places is so fine a timber that its boards are often equal to the best of any market. The supply of this timber in Eastern Oregon is very great.

The black pine (Pinus contorta) is abundant along the coast, along the eastern slopes of the Cascades and on the more elevated of the plains beyond. It is a small tree, used for fuel, but is of very little value for timber or for dressed lumber.

The tuberculated pine (Pinus tuberculata) is only found on the mountains and is a small tree of but little economic value. It is remarkable for its habit of retaining all of its old cones attached to the body of the tree. Small groves of this tree may be seen on the upper slopes of the Siskiyous and many places on the Cascades. It rarely reaches the height of 60 feet; its cones, six inches long, never open of their own accord to show their seeds as do other pine cones.

Pinus Muricata and Pinus Sabiniana are rarely found in Oregon.

A good deal of confusion of names has fallen on this group of trees, not only in the popular names they have received but

in the scientific as well. The American R. R. surveys in their reports of our forestry named the trees of this group having pendant cones, *Abies*, and those bearing upright cones, *Picea*. The popular names are spruce and fir. The popular maintenance of this distinction became easy, and inasmuch as a popular description of their place in economic botany is what is here attempted, we will retain this distinction of the R. R. surveys and call those bearing pendant cones, spruce; all bearing upright cones fir;—the former *Abies*, the latter *Picea*.

Abies Douglasii—Pseudotsuga Douglasii. Popularly and especially in the lumber market this ought to be called Douglas' spruce. In Oregon and Washington we have it in two varieties—'red fir' and 'yellow fir.' The yellow is a fine grained wood, and its boards are often as smooth as pine, while the red variety is more stiff and splintery. But red or yellow, this fir is one of the grandest trees of the continent and one of the most important to commerce. For spars, for bridges or for framing for buildings, its strength and great length make it the first in the market. Its great abundance and rapid growth ensure a long continued supply. Douglas' spruce will raise more commercial timber to the acre than any other tree on the continent.

Abies Menziesi—Menzies' or Tideland Spruce. This fine forest tree is seen in its best condition along the coast, where it often reaches the height of 100 feet or more. Its lumber is soft and heavy and coarse, but is so tasteless and odorless that it is found to be the best material for barrels and boxes for packing, and for these purposes is now finding a wide market. It is a handsome ornamental tree and easily transplanted.

Abies Canadensis—Tsuga Canadense—Hemlock Spruce. In any country less favored in commercial timber the hemlock of our mountains or that of our coast would rank well. It reaches its finest growth in Tillamook county. The young trees are graceful ornaments in landscape gardening and are easily transplanted.

Abies Williamsonii—Williamson's Spruce. A handsome tree of elevated mountain habits and so out of reach of present commercial demands. All these spruces have pendant cones

Thomas Condon.

THE DAY LILY OF THE DESERT.

(From *Garden and Forest*, III, 128.)

One of the most beautiful and characteristic plants of the desert region of California is the Day Lily (Hesperocallis undulata). Its flower stems rise from one to two feet above the sand, and bear from a few to thirty or more fragrant flowers, in color, I should judge, of a pearly or greenish white, with greenish stripes. I have seen only one in blossom, and that was too far gone to show the genuine tint.

This interesting species is one of the most promising novelties

of the present season, not only for its promise of furnishing us with another lovely garden flower, but also for its probable economic value in the arid regions of the west. It produces a large edible bulb, varying from one to four inches in diameter, nearly round, with firm flesh. The bulb has a pleasant taste, eaten either raw or cooked like onions. Our party of seven have had them cooked at nearly every meal since we first tested their qualities, and in the lack of other vegetables find them acceptable.

The bulb is found from six to eighteen inches below the surface of the sand or fine gravelly soil, in which the plant thrives best, and is usually found resting on moist gravel or a clay subsoil.

It is not rare on the Colorado and Mohave deserts, and usually blossoms on the Mohave in the month of May. Near the boundary line it bloomed in 1889 as early as February, and was in seed in April. This year (1890) only a few plants are found showing as yet any signs of a flower stem, but a few weeks of warm weather will doubless bring them forward.

The Indians are said to obtain both food and drink from this plant when crossing the plains. For eighty or a hundred miles along our southern border one may travel at certain seasons without finding water. The traveler, is safe, however, if he knows how to search successfully for this important vegetable, and once found he need not fear either hunger or thirst.

Should it prove susceptible of easy cultivation in the arid regions of the west, it will prove a valuable addition to our list of vegetables. It will certainly prove a welcome addition to the garden, if not an acquisition to the farm. *C. R. Orcutt.*

CALIFORNIAN LILIES.

(From the *California Florist and Gardner*, II, 66)

Eight distinct species of lilies are natives of California, besides varieties. They are Lilium Columbianum, L. Humboldtii, L. pardalinum, L. parvum, L. Parryi, L. maritimum, L. Washingtonianum, and L. rubescens. No other country in the world is so rich in these floral beauties, except Japan. Their range is from the sea-coast of Mendocino county to the edge of perpetual snow in the Sierras. Old Shasta's sides are the home of several species. I have found L. Humboldtii in the rich alluvium of the upper Sacramento valley, and L. Parryi, one of the most beautiful, is a native of the high mountains of San Bernardino and San Diego counties.

As a collector I have taken many thousands of the bulbs of six of these species from their native homes, and I have grown all but L. Parryi. In the soil in which they flourish and in the manner of root growth they vary greatly. Briefly, it may be said that L. maritimum, L. pardalinum, L. parvum and L. Par-

ryi are bog lilies with running or rhizomatous roots; that L. Humboldtii and L. Columbianum are native to rich clayey soils. and that L. Washingtonianum and L. rubescens rot easily in cold or wet soils, that they are true bulbs, and that they thrive in well drained soil of leaf mold mixed with disintegrated sandstone or gravel.

Lilium pardalinum, often called tiger lily by the country people, is the most easily grown of all. It has an erect stem with many long, lanceolate, pale green leaves, in whorls. The flower is large and showy; the petals, bright crimson at tips, orange dotted or blotched with black at center, and recurved to the stem. There are few more brilliant sights than a well bloomed plant of this lily. The root is hardy and little subject to rot. It prefers a rich sandy mold, but adapts itself to varying conditions. In a shaded pond I saw fine specimens on the mold of old logs, the fibrous roots running down into the water. They were six to seven feet high with the finest of blossoms. In the rich mold below mountain springs, or in the alluvium on the banks of small streams, they grow to perfection. I have seen them doing well in a sandy soil which in midsummer was as dry as a brick. In cultivation I have seen the best results from planting in a sunken barrel filled with sand well mixed with leaf mold or bog soil. It should be kept moist, not wet, and is better in the shade. The bulbs should be planted about four inches deep. Under such conditions I have seen strong plants grown five to seven feet high, with an abundance of bloom. Once planted, the roots should be undisturbed. They spread rapidly in geometrical ratio. The bulb of this year throws out two glowing roots this fall, each of these throws out two next fall, etc. When the clump gets too thick, the soil can be taken off it and the smaller roots removed without disturbing the ones to be left. I have seen clumps of four or five hundred in the wild state, the product of one bulb. Both leaf and flower of L. pardalinum have wide variations, and three or four varieties are named, but it is hard to lay down a dividing line, as the varieties run into each other.

L. Californicum is a variety with narrow leaves, and a brilliant flower; the tips of the petals a rich crimson and the dots small. Variety puberulum has paler flowers and broad leaves. The English florists have found a clear yellow form which they call L. Wareii, but I have never been able to secure a specimen

Lilium maritimum is one of the rarest in cultivation; this is for a double reason. The bulb is difficult to handle, being particularly liable to decay in handling. Then, too, its range of growth is limited. It grows in and around peat bogs, on the coast of Mendocino county—rarely farther north or south. It is seldom seen farther than two miles from the ocean. The surface of these bogs is dotted with clumps of ferns and azaleas. Around the bogs is a waste of gray, ashy looking sand, densely covered with heath, cypress and pines. On the edges of the bogs the lily is a

dwarf, often blooming at three or four inches. In the bogs it roots itself in the tufts and grows a lovely plant, five feet high with ten or fifteen fine blossoms. The leaves are dark glossy green, and the blossom crimson. At Ukiah, Calif., I have grown it easily in a reclaimed swamp in the shade. The soil is of vegetable matter and sand, and always moist. In the same situation L. parvum, L. pardalinum, L. Columbianum and L. Humboldtii, as well as the Japanese L. auratum, make a vigorous growth, and what is not usual for the latter, strong bulbs. At Ukiah there is little fog, and there are days in the summer when the thermometer will register above 100° F.

Lilium Parryi is similar to L. pardalinum in leaf and bulb, but the bloom is lemon yellow and very fragrant. Of its cultivation I cannot speak, but believe it easy of culture under the same conditions as L. pardalinum.

Lilium Columbianum is L. Humboldtii in miniature. The bulb is small and compact. The stalk is two feet or so high, and the flowers true lily-shaped, the petals recurved. In color it is a light orange-yellow, dotted with dark spots. This lily has for its native home the plains of the Columbia river. It is easy to grow in cultivation, only needing a well-drained loam and ordinary moisture.

The bulb of Lilium Humboldtii is often a pound in weight, and is very compact. The stalk is strong and stiff. The leaves are arranged in circles or whorls and are many in number. Eight or ten blossoms to the stalk are not unusual. These are of a reddish orange with round dark spots. Ordinarily this lily will grow to a height of three or four feet. The finest specimen it has been my fortune to meet grew in the debris by the side of a Sierra stream. It was over eight feet high and had an enormous bulb. This lily increases by seeds only, in its native state, and where the natural conditions happen to be exactly suitable is found in great numbers. I took over eight thousand good bulbs from one place some years ago. It was on a hillside in volcanic soil, where years ago the gold miners had cut the timber. I had spent the previous week in hard traveling to find five hundred.

I once found fine bulbs in an oak grove near Chico. They were doing splendidly in the black adobe of that section. In cultivation I find it will thrive in clay loam or sandy soil. In hot sections it does better planted in the shade. It needs to be planted six inches to a foot deep, and will give the grower value received.

High up in the Sierras above the pine timber on those grand slopes crowned with a mixed growth of wild cherry, manzanita and ceanothus, Lilium Washingtonianum finds its most congenial home. The soil is loose decomposed granite and mold. The snow lies very deep in the winter and is late in melting. It keeps the bulbs moist in their early growth, and when it is gone they make a very rapid growth, often blooming six or eight weeks

after the snow has melted. The stalk grows up from three to five feet, densely leaved in whorls, and with from a few to twenty-five flowers, pure white and with a most delicious fragrance. I have seen places fairly white with this lily and the air heavy with perfume. The bulb is large. I have bloomed it at Ukiah, but find it rather harder to bloom than any of the other native lilies. I believe, however, that it is quite successfully grown in England. It should be given a loose soil and abundant moisture during the growing season.

Lilium rubescens is like L. Washingtonianum in every particular excepting that the flower blooms out pure white, blotched with purple, and gradually gets darker till it is of rich ruby color, hence its name. Similar as the two lilies are in habit, their native homes are very different. L. Washingtonianum is a lily of the high Sierras, L. rubescens of the Coast Range. It is found in the redwoods close to the coast, on shaded hillsides in sandstone gravel, and on high ridges in the chapparal. The finest I have ever seen in numbers were on a chapparal ridge in a soil of gravel mixed with mold, of the ordinary chapparal soil. The bulb grows deep and has abundant moisture in winter and spring, but in the summer such places get very dry. A friend grows and blooms them readily in half barrels filled with sand and mold and placed in the shade. The first essentials with them are perfect drainage and a loose, porous soil. Of all our California lilies it is the most beautiful, and of all lilies the most deliciously fragrant. A flower will perfume the leaves of a book for months, and a well grown plant is the admiration of all beholders.

Carl Purdy.

CALIFORNIA FLOWERS IN ENGLAND.

(Extracts from correspondence.)

Phacelia Parryi, with dark violet purple flowers, is now well-known. It has been in cultivation here several years and seed is cheap. It is lower in price and much less in request than P. campanularia, which I introduced through Messrs. Parish. The latter is more delicate. If the season happens to be wet, the plants die off.

If the Californian seeds like the European climate they soon get cheapened, through the competition which prevails here. But they are not all at home, in England at least. I failed to do any good with Gilia aurea, which Messrs. Parish once sent me. But G. dianthoides, G. dichotoma, and others do very well.

Mimulus glutinosus has long been grown here under its early name of Diplacus (Nuttall's), also a form with red flowers (puniceus); they outlive mild winters, but perish in severe ones. I may make the same remark of Dicentra chrysantha. It is only seen to advantage in a climate like yours—which would suit me well, but I am too old to transplant.

I have also grown Mimulus brevipes. Monardella lanceolata is grown on the continent of Europe by some of the large seed growers.

Dodecatheon Clevelandi has grown well, and much more quickly than the eastern forms usually do. The eastern forms do not usually grow until after a considerable interval, but the seed of D. Clevelandi germinated in a few days. The plants do not get beyond the seed leaf the first season in any of the varieties.

Wm. Thompson.

A fine red lynx (Lynx rufus) was recently caught in a steel trap at Coburg, Oregon. It was eighteen inches in height at the shoulders, two feet and three inches long from the nose to the root of the tail, and the tail was seven inches long.

CALIFORNIA TREES AND FLOWERS.

'In all parts of the civilized world, the refinement, innocence and happiness of the people may be measured by the flowers they cultivate,' says an eloquent author. I would add, that the wild flowers of a country must furnish a truthful index to the adaptability of that land as a home for the human race, for, where they abound, there too man may seek for fruitful toil, pleasure and rest.

Where may lovelier flowers, more brilliant tints, or more delicate coloring be found in greater profusion than on the mountains and mesas, in canyon and meadow, throughout the length and breadth of California! And where may a more perfect abiding place be found for man!

It is to the beautiful annuals which in springtime cover the hills and mesas, that California owes her just fame as a land of flowers. Perhaps in no country in the world do the early spring flowers so change the face of the earth from a desolate waste to a beautiful garden, as on the Pacific coast—hills, mesas, mountains and valleys, and the arid plains of the desert, alike, quickly responding to the vivifying rain. California has probably already furnished to the horticulturist a greater variety of beautiful flowers and stately trees than any other State in the Union. Yet many others are awaiting the appreciation of man, or wasting their sweetness on the desert air.

In this essay it is intended to give brief descriptions of those already introduced into cultivation, with reference to the varieties produced by cultivation, together with notes on many that are well worthy of introduction. A few trees and plants, not natives of California, but now closely identified with our flora, either by cultivation or naturalization, are also noticed.

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*) An asterisk indicates that the colors have been carefully determined by comparison with Ridgway's 'Nomenclature of Colors.'

ABIES.

The firs are magnificent trees, of pyramidal form and rapid growth.

A. BRACTEATA *Nuttall.* A tall, slender, strictly pyramidal tree, 100 to 150 feet high and one to two feet in diameter. Unknown in cultivation.

A. CONCOLOR *Lindl.* The Silver Fir is a very ornamental tree, growing from 80 to 150 feet high, attaining a diameter of three or four feet. Foliage of a pale silvery green, whence its name.

A. GRANDIS *Lindl.* The White Fir attains a height of 200 to 300 feet, with a diameter of three or four feet, and is distinguished by the glossy, green upper surface of the leaves.

A. MAGNIFICA *Murray.* The Red Fir exceeds 200 feet in height, and reaches a diameter of ten feet. Foliage rigid, bark thick of a reddish brown color, from which it receives its vernacular name in common with the following species.

A. NOBILIS *Lindl.* Red Fir, scarcely distinguishable from the preceding species.

ABRONIA.

The Abronias are charming trailing plants, sometimes called wild verbenas from the resemblance between the verbena and their showy umbels of brilliant flowers, which are of great fragrance, and produced abundantly.

A. LATIFOLIA *Eschscholtz.* Waxy lemon yellow flowers, possessing the odor of orange blossoms. A hardy annual in cultivation, perennial in its wild state, like the following species.

A. UMBELLATA *Lam.* The finest species, producing a profusion of large umbels of bright rose-purple flowers.*

A. VILLOSA *Watson.* A slightly smaller plant, but producing equally large umbels of bright rose-purple flowers.*

ABUTILON.

The Abutilons are highly prized green-house plants, of elegant habit. California offers one of the most beautiful species, as yet unknown in cultivation.

A. AURANTIACUM *Watson.* A low compact shrub, a foot high, with large, velvety, light green leaves and showy 'golden flowers.' Found near the southern border of the state, in Lower California.

ACACIA.

Several Australian species of Acacia have been extensively grown in California, either for their beauty or utility. Only one species is a native, and that, A. Greggii, or Cat's Claw, cannot be recommended for trial. These are mostly small trees or shrubs of rapid growth.

A. DECURRENS *Wildenow.* The Black Wattle is one of the most prized, and is largely planted for forest culture, because of its rapid growth, the value of its timber, its beauty and the bark which is rich in tannin.

A. DEALBATA *Link.* Silver Wattle. Very ornamental.

A. FARNESIANA *Wildenow.* Oppopanax is prized for its delicate, delicious and wonderfully persistent perfume, for which it is often grown. It is valued for other reasons, and is of especial historic interest, since it is credited with having furnished the crown of thorns with which the Savior was crowned.

A. MELONOXYLON. Make one of the finest of sidewalk trees, sturdy and symmetrical in form.

A. PYCNANTHA *Bentham.* The Golden Wattle is second only to A. decurrens in importance for its yield of tanner's bark.

ACANTHOMINTHA.

A. ILICIFOLIA *Gray.* A showy mint-like annual, abundant on the mesas near San Diego, and well worth attention. A span high, with white flowers marked with purple.

ACTINOLEPIS.

A. CORONARIA *Gray.* A low annual bearing numerous yellow flowers.

ADENOSTOMA.

Evergreen shrubs, belonging to the rose family, two to ten feet high, which produce an effect upon the landscape similar to that of the heaths of the Old World. By studying the natural blending and contrasts of our wild shrubs and trees in their native haunts, the landscape artist could gather some useful hints, and the species of this genus would prove useful in his work.

A. FASCICULATUM *Hooker & Arn.* This *Chamisal* often covers large areas of country so densely as to be almost inpenetrable. The foliage is very dark green.

A. SPARSIFOLIUM *Torrey.* Foliage light pea green; flowers in large terminal panicles, white and fragrant.

AGAVE.

The so-called Century Plants are among the best known of the succulent ornamental plants that are in cultivation. California furnishes several beautiful species.

A. DESERTI *Engelmann.* A glaucous-leaved species, peculiar to the Colorado Desert. Flower stalk seven to ten feet high, surmounted with a large panicle of flowers of a chrome yellow.* These plants, also known as Mescal or Maguey, from which the alcoholic liquor *mescal* is made, are useful for their strong fibre.

A. PRINGLEI *Engelmann.* A mountain form of A. deserti, rare and beautiful.

A. SHAWII *Engelmann.* One of the most striking and ornamental species of the genus, prized for its compact dark green leaves.

A. PARRYI *Engelmann.* Native of Arizona, as also the following species.

A. PALMERI *Engelmann.*

A. SCHOTTI *Engelmann.*

ALFILARIA.

Erodium cicutarium and E. moschatum are about equally well known by the name Alfilaria, and are valuable forage plants. The foliage is finely divided like a fern leaf, and the rose-purple* flowers are half an inch across. The two generally grow together so that the seed is generally mixed. A considerable demand has sprung up, and Alfilaria is being extensively sown in arid localities for forage

ALLIUM

A large genus, including the onion of the vegetable garden. Some of the wild forms native to California are very pretty, but mostly with small flowers and worthless for cutting. Interesting garden plants.

A. ACUMINATUM *Hook.* Usually a low plant, six inches high, with a good sized umbel of pretty rose-purple flowers.

A. CUSICKI *Watson.* A dwarf vernal form, with white flowers commonly tinged with purple.

A FALCIFOLIUM *Hook & Arn.* Flowers rose colored.

A FIMBRIATUM *Watson.* A pretty plant, abundant in the mountains of Southern and Lower California, bordering the Colorado Desert. It sends up a stout scape a few inches high,—rarely more than three inches—bearing twenty-five or thirty flowers of a deep rose purple*, sometimes of a light shade. Its Mexican name is *Lavina.*

A. HAEMATOCHITON *Watson.* A small species, six or eight inches high, bearing an umbel of six to twelve small white flowers with greenish stripes and a reddish brown centre. It is a tender plant.

A. SERRATUM *Watson.* A showy little plant, about ten inches high, with a naked stem and a many-flowered umbel of dark, bright rose-purple* flowers half an inch wide.

A. UNIFOLIUM *Kell.* A unique little species, with white to rose-purple flowers. Three inches to a foot high.

ANTIRRHINUM.

A. ORCUTTIANUM *Gray.* A tall, slender annual, with long spikes of either white or violet flowers, discovered in 1882. Perhaps the prettiest of the wild Snapdragons of California.

AQUILEGIA.

Graceful perennial plants, hardy and very ornamental. Columbine.

A. CAERULEA *James.* Two feet high, with large showy blue or white flowers.

A. CAERULEA FLORE PLENO. Double flowers.

A. CHRYSANTHA. A fine species, with long yellow spurred flowers. The most graceful and beautiful for cultivation.

A. TRUNCATA *F. & M.* The form in cultivation is a hybrid, with large yellow flowers, the sepals and spurs of a deep orange red.

ARBUTUS.

A. MENZIESII *Pursh.* The Madroña is a handsome tree, sometimes a hundred feet high, with reddish bark and lovely white flowers.

ARCTOSTAPHYLOS.

The Manzanitas are handsome shrubs, with reddish exfoliating bark, evergreen—usually light colored—foliage, and lovely clusters of bell-shaped snow-white or rosy blossoms, which often appear even before the snow is off the ground. If these could be coaxed into the same graceful habits of growing under man's care as obtain with them in their wild state, they would be among the most popular of the ornamental shrubs of the Pacific Coast.

A. BICOLOR *Gray.* A coast species, a few feet high.

A. GLAUCA *Lindl.* A fine but variable mountain form.

A. MANZANITA *Parry.* The *Manzanita*, one of the largest and most beautiful species, peculiar to the Pacific Coast.

A. OPPOSITIFOLIA *Parry.* A willow-leaved species from Lower California.

A. PRINGLEI *Parry.* A peculiar mountain form. Very beautiful.

A. UVA-URSI *Spreng.* Bear berry.

ARGEMONE.

A HISPIDA *Gray.* Thistle Poppy A stout prickly annual three to six feet high, producing numerous large, showy, white flowers, four to five inches in diameter, almost rivaling the Romneya in beauty, and conspicous by night or day. Foliage bright green. A very decorative plant, recommended for large grounds.

A. MEXICANA *L.* Flowers yellow. Otherwise similar.

ASTER.

A beautiful perennial species, a foot high, with large conspicuous flowers, two inches across, and of a delicate mauve or lavender, has lately been discovered on the Colorado Desert. It is likely to prove an acquisition to horticulture.

BAERIA.

The Baerias (named in honor of Prof. Baer of the University of Dorpat) are very pretty annuals, of easy culture in ordinary soil.

B. GRACILIS *Gray.* A span or more high, producing many small heads of small, yellow flowers.

BLOOMERIA.

Bloomeria is a genus of beautiful liliaceous plants related to Brodiæa, and peculiar to California.

B. AUREA *Kellogg.* The broad glossy leaf three or four feet long. The large bulb, an inch in diameter, grows six inches deep in the soil, producing a tall scape bearing a large umbel of showy orange colored flowers.

B. CLEVELANDI *Watson.* A smaller plant, seldom over six inches high, with umbels of bright yellow flowers. Named in honor of Mr. D. Cleveland, of San Diego.

BREVOORTIA.

B COCCINEA *Watson.* Vegetable Firecracker. A showy plant, producing a tall grass-like stem two to three feet high, bearing a pendant umbel of richly colored flowers, blood crimson tipped with white, one to three inches in length.

BRODIÆA.

The Brodiæas have narrow grass-like leaves and slender stems bearing an umbel of bright colored flowers. All are easily grown and forced, doing well in clayey, rather moist soils, but should be dried off at time of blooming.

I.—BRODIÆA.

B. CAPITATA *Benth.* Flower stalks slender, a foot high, bearing a dense head of purple flowers. Sometimes called Wild Hyacinth.

B. CAPITATA ALBA. A pure white form, prized in cultivation.

B CONGESTA *Smith.* Two to four feet high, with deeper, brilliant purple flowers

B. MULTIFLORA *Benth.* Low, six inches high, bulb producing several slender stalks, bearing umbels of purple flowers.

II.—HOOKERA.

The following species are considered by some botanists to form a distinct genus named Hookera.

H. GRANDIFLORA *Smith.* Produces a few very large glossy purple flowers.

H. MINOR *Watson.* Bears a loose, spreading umbel of large royal purple flowers from a short stem. A general favorite.

H. ORCUTTII *Greene.* A foot or two high, with large lavender to royal purple flowers, discovered in 1882. One of the choicest species.

H. STELLARIS *Green.* Flowers rich purple with white center, in a star-like cluster.

H. TERRESTRIS *Kellogg.* Flowers red-purple.

III.—TRITELEIA

The following species are included by Prof. Greene in the genus Triteleia, but they are best known in cultivation under the old classification.

T. HYACINTHINA *Greene.* Flowers milky white, banded with green.

T. IXIOIDES *Watson.* Low, bearing numerous light yellow flowers banded with green. Very pretty

T. LAXA *Benth.* Tall, with umbel of 15 to 30 large blue flowers.

T. PEDUNCULARIS *Lindl.* Flowers glossy purple on long stems. Rare.

CALANDRINIA.

C. MENZIESII *Hook.* A low, succulent annual, very variable, with pretty red or purple flowers.

C. MENZIESII ALBA. Flowers pure white.

C. ROSEA. A form in cultivation, presumed to have originated in California.

CALOCHORTUS.

I.—MARIPOSA TULIPS.

These Tulips, excepting the true lilies, are the finest of the beautiful liliaceous plants of the Pacific Coast. The Mariposa or Butterfly Tulips are highly recommended for winter flowering and are gaining great popularity in the East and in Europe. Each species varies greatly in color, and the erect, cup-like flowers are of large size, and of the richest and most brilliant coloring. The stout, slender flower stalks vary from eight inches to two or three feet in height, each bearing from a few to fifteen or twenty flowers.

C. AUREUS *Watson.* Three to six inches high, flowers clear yellow, or with a narrow crescent of purple above the well-defined roundish gland, which is densely covered with reflexed hairs.

C. GUNNISONI *Watson.* Petals light lilac, yellowish green below the middle, banded and lined with purple.

C KENNEDYI *Porter.* A rare species only known in the Mojave Desert where it is very difficult of access. The large flowers two inches across, of a deep orange vermilion,* produced on short stout scapes. *A magnificent species*

CALOCHORTUS.

EDITORIAL.

There is a wide field on the Pacific Coast for the SCIENTIST. The botanist, the zoologist and the geologist may each keep his hands well employed, discovering and recording new facts, each in his special division. Inseparably connected with the sciences, pure and applied, are all the industries of the human race. The stockman and farmer may glean many items of interest and practical value to him from the note-book of the zoologist. The miner and the manufacturer will be well repaid in a fund of useful information if he but consults the field notes and general conclusions arrived at by the geologist; in the laboratory of the chemist or mineralogist other useful information will be found.

Still more intimately connected with the science of botany are the many industries embraced in the general terms, agriculture and horticulture. And those dependent upon these, the most important of the industries of the world, must also give attention to many related branches of knowledge if they would reap the greatest returns.

Recent investigations have led to a better realization of the intimate relations between the sciences, and pointed out how, by studying one from a standpoint of investigation, we may better apply our knowlege of another science in industrial enterprises.

We refer especially to the biological survey of the San Francisco mountain region, in Arizona, by Dr. C. Hart Merriam, chief of the division of mammalogy of the United States Department of Agriculture. In North American Fauna, No. 3, Dr. Merriam publishes the results of this exploration and presents important facts bearing on the geograpical distribution of plants and animals. Instead of the usual outline of faunal districts he conclusively shows that distribution of species is more intimately connected with altitude than upon the geographical location. He points out how the horticulturist may materially profit by studying the natural vegetation around him; how the stockman may know what breeds of animals are best adapted to a given region, by noting the existing conditions of soil and climate, the wild animals which abound, and in instituting comparison between different sections of country.

This magazine will devote a considerable number of its pages during the coming year toward arriving at a better acquaintance with the fauna and flora and other natural resources of the Pacific Coast. It will be our aim each month to present something of interest and practical value not only to the naturalist—amateur or professional—to the botanist and horticulturist, but to all who are interested in attaining to a truly liberal education.

There is a recognized field for a journal of the character we have roughly outlined. True literature—instructive and entertaining—on any branch of science is comparatively rare and difficult of production. We hope through industry and perseverance to attain the end in view with the assistance of those whom we are well pleased to call friends.

NOTES AND NEWS.

Aspidiotus rapax, a scale-like insect, has recently been reported for the first time as occurring on the fruits of the orange and the lemon in Southern California.

A fine specimen of a Cycad was discovered in some gravel from the bed of the North Umpqua river, near Roseburg, Oregon, by Mr. Russell, of Yoncalla, Oregon.

The Oregon Alpine Club has for its objects the acquirement of information about the rivers and mountains of the northwest coast, and relating to the geological formation, mineral resources, and the fauna and flora of that region, together with the formation of a museum. Its membership already includes hundreds of the best learned men and women in the State, and other localities may profit by its example. We hope to publish the proceedings of this and other societies as they may be furnished.

The hop crop of Oregon and Washington for 1890 was nearly 60,000 bales, valued at $1,800,000, while the loss sustained by this crop from the hop louse (Phorodon humuli) is estimated as fully one-fifth of that amount. The ability to destroy $360,000 worth of crops in a single season renders this eastern pest, apparently so insignificant in itself, worthy of careful study and investigation as to methods for its destruction.

Coloradia pandora, the large moth which was attracted the past season by the electric lights in southern Oregon in such vast numbers, was originally described from Colorado (whence the name) by Chas. A. Blake, one of the older members of the American entomological society of Philadelphia. The larva (presumed to be of this species) has lately been described as follows, from a specimen found feeding on sage brush in Montana by Mr. Wiley: Mature larva all black, with shiny spines which sting the hand like Hyperchiria io. Pupa somewhat resembles that of H. io, but smaller, and less robust, nearly black.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the library of the West American Museum of Nature and Art will be catalogued monthly.

4051. Descriptions of two new species of mammals from Mt. Kilima-Njaro, East Africa. By Frederick W. True.

4052. Osteological characteristics of the family Muraenesocidae. By Theodore Gill.

4053. On the family Ranicipitidae. By Theodore Gill.

4054. The osteological characteristics of the family Simenchelydae. By Theodore Gill.

4055. The characteristics of the Dactylopteriodea. By Theodore Gill.

4056. Notes on the birds observed during the cruise of the U.

S. Fish Commissioner schooner Grampus in the summer of 1887. By William Palmer.

4057. Description of new forms of upper Cambrian fossils. By Charles D. Walcott.

(Nos. 4036-4057 inclusive are extracts from the Proc. U. S. Nat. Mus., XIII (1890) and received from the Smithsonian Institution.)

4058. American Journal of Numismatics and bulletin of American Numismatic and Archaeological societies, XXIV, No. 4, April, 1890.

4059. Same, XXV., No. 1, July, 1890. Contributions of alchemy to numismatics. By Henry Carrington Bolton, Ph. D., forms the leading article in this and the preceding number. From the author.

4060. Bibliotheca Polytechnica. Directory of technical literature. A classified catalogue of all books, annuals, and journals published in America, England, France and Germany including their relations to legislation, hygiene and daily life. By Fritz von Szczepanski. First annual issue, 1889. Price 75 cents. The author, St. Petersburg and Leipzig. The International News Co., N. Y.

The catch-words are given in English, French and German; a compact, handy little book, which will be very useful to those having to consult technical literature. 8vo. 80 pp.

4061. Annual report of the State Board of Horticulture of the State of California. for 1890. 8vo. 522 pp.

A most useful volume with invaluable information relating to the olive, orange, lemon, fig and other fruits, handsomely embellished with colored plates and numerous engravings. The Mission olive is thus illustrated, and numerous injurious and beneficial insects are figured.

4062. Le Nov Latin, international scientific lingua supernatural bases. By Dr. Daniel Rosa, Royal Zoologic Museum, Torino, Italy, 1890. From the author.

GOOD LITERATURE.

The publishers of *The Youth's Companion* have sent us a handsome souvenir with the announcements of authors and articles for the next year's volume. It has seven illuminated pages, one for each day in the week, very quaint in style, the whole forming a 'Book of Days,' and each page illustrating a line of the old rhyme:

' Monday for Health,
Tuesday for Wealth,
Wednesday the Best Day of all,
Thursday for Losses,
Friday for Crosses,
Saturday No Luck at all;
Sunday the Day that is Blest
With Heavenly Peace and Rest.'

This novel and unique Calendar is sent free to all new subscribers to *The Companion* who send $1.75 for a year's subscription and request it at the time they subscribe.

The most beautiful frontispiece ever produced in an American magazine, appears in the January number of the *Cosmopolitan.* It is a reproduction in colors of Francoise Flameng's famous picture "The Cake Seller," and can scarcely be distinguished from the imported photogravure which is exhibited in the dealers' windows, at the price of $7 a copy. It is one of the most charming of subjects, and is well worth framing and preservation. The *Cosmopolitan* has become noted of late for its frontispieces and this very much excels its previous efforts.

The first installment of the selections from Talleyrand's long-expected Memoirs is the most striking feature of the January *Century.* A sketch of Talleyrand by Minister Whitelaw Reid prefaces this installment. The opening pages tell of Talleyrand's neglected childhood, and his entry into Parisian society. They also give his views of La Fayette, and the effect of the American on the French Revolution; some account of the beginnings of the latter; a very contemptuous opinion of the Duke of Orleans; a sketch of the author's stay in England and the United States, and a highly interesting conversation between himself and Alexander Hamilton on Free Trade and Protection.

Outing for January is a superb Holiday number, seasonable in matter and elegant in illustration. 'The Mystery of a Christmas Hunt' is a story pervaded by such sportsmanlike spirit and domestic felicity as to lend a charm to the well-drawn pictures that follow in rapid succession from the first page to the last. No better Christmas story has appeared in any magazine for years. 'Lost in the Rockies,' a midwinter adventure, stirringly and powerfully told, follows, and 'Honeymooning Under Difficulties,' a true story of the snow-swept plains of Manitoba, completes a trilogy of fact and fiction hard to beat; and just now, when cross-country running is a pastime supported with all the enthusiasm of its devotees, 'The Last Paper Chase,' by Wm. Earle Baldwin, enriches the incidents of the field with the interest of a most excellent bit of social fiction.

In the January *St. Nicholas*—the second of the Holiday numbers of this magazine—Charles Dudley Warner calls up the thousands of its readers to hear 'A Talk About Reading,' which is delivered with all the earnestness of a true humorist when talking of graver matters. The Pratt Institute, Brooklyn's Great Industrial School,' is fully described by a well-informed writer, and explained by the artistic illustrations of Mr. Wiles, and the young people will marvel at this wonderful school wherein are taught all things teachable, from high art to dusting a room.

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"My system was all run down; my skin rough and of yellowish hue. I tried various remedies, and while some of them gave me temporary relief, none of them did any permanent good. At last I began to take Ayer's Sarsaparilla, continuing it exclusively for a considerable time, and am pleased to say that it completely

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LABORATORY WORK IN SCHOOLS AND COLLEGES. FROM THE STANDPOINT OF A ZOOLOGIST.

'The system now in use in our high schools is all wrong.' So spoke, recently, a prominent educator in Oregon. 'Parents,' he continued, 'are giving up each year more and more of the oversight they ought to give their child's education and putting the responsibility entirely upon the public schools. As it stands now, if a child leaving our schools is weak mentally, morally or physically, we, the teachers, are blamed, whereas we, in our turn, are obliged to put each and every student through a certain course of study without consideration as to the student's ability, temperament, character, or mental tendencies; they are forced through this public school curriculum, *willy nilly*, at the expense of individuality. Now, since parents are giving up home teaching, so invaluable in bringing out the best points in a child and encouraging him away from his weak points, and since this serious responsibility is placed upon the public schools, where numerous scholars and lack of time prevent proper attention being given to each one, what remedy is there for this individuality-destroying system which we now find in these institutions?'

The writer, overhearing, takes this text and opportunity to try to show the value of laboratory work in high schools as well as in colleges, hoping, however, that some educator in this state will supplement his rather brief treatment of laboratory work in high schools with more complete details of possibilities.

The value of laboratory work has been long appreciated in the universities of Germany and in all the advanced institutions of learning in America. This work means, in the case of zoölogy for instance, that each student taking that course must spend a large proportion of his or her time in the laboratory studying the structure or the physiology, or both, of certain typical, well-known animals. He must see with his own eyes, think with his own brain, do his own theorizing and draw his own conclusions *unaided*, independent of book or fellow scholar, and must show that his work is correct by neat original drawings and original descriptions. One animal finished, another from a different group is given and the student encouraged to describe the differences and resemblances between this animal and the previous one studied, and so on from the lower to the higher forms.

No one but an enthusiastic adherent to this teaching principle can appreciate the phenomena that appear in the cases of different students in this work. Some, so brilliant in recitation that they repeat pages, are almost complete failures; others though slower in committing text, have eyes and minds alert. It is a case where, frequently, 'the last shall be first and the first last.'

For this reason firmness is necessary on the part of the would-

be successful teacher; the weaker students must be obliged to stand on their own ground, they must learn to train their own powers of observation, exercise other mental gifts than that of memorizing, and become as far as possible as proficient in the laboratory as in the class room. We would not, by the above statement, wish to lay ourselves liable to the accusation of being in favor of abolishing text books; on the contrary we believe that the judicious use of good text books and reference books is a valuable adjunct to laboratory work. But, certainly, we only truly learn that which we make our own, part of ourselves, and many a book learned lesson and principle has faded from memory to give place to something actually seen.

A trained biologist in an eastern college, having charge of a zoological laboratory with which we were fortunately connected, rarely looked over his pupils' examination papers, 'for,' said he, 'by almost daily contact with each student, by observing their method of work, their faithfulness or the contrary, the accuracy or inaccuracy of their observations, I become conversant with their mental status and can grade them as they deserve'

The same principles of laboratory work, as above outlined for zoology, hold in physics, chemistry, geology, botany, household economics and other branches. Independent observation and thought is the keynote in them all.

As previously intimated, a student blind to the beauties of zoology (if the reader will pardon the conceit) profits from work in a zoological laboratory just so far as he acquires there habits of originality and independence in mental and manual work which will help him in after life. It has been the writer's experience and observation that many a student promising little at the beginnining of a laboratory course, has, by being held rigidly to the principle at stake, developed into a capable worker, pleasing and astonishing his teacher by bringing to the surface latent gifts not suspected to exist.

Advanced workers in zoology, botany, chemistry, etc., seek and find opportunities in our seaside laboratories and post-graduate universities to carry out their ambitions in the way of original research, but it is only those workers who have learned habits of independence in earlier training that can hope to rank with those from whose efforts come reports of wonderful discoveries which delight scientists and aid humanity.

It would be, indeed, a difficult and radical move to attempt to introduce into our high schools any such system as above outlined, and yet it would seem, to the writer, that a modification of the present system, coupled with laboratory methods to such an extent as to do away with a large proportion of the indiscriminate cramming, for such it is, now present in these institutions, might be possible. Laboratory work as now practiced in the best colleges and universities, is only a very much advanced kindergarten, for children of a larger growth; an oppor-

tunity for a student to develop his individuality under the immediate direction of a capable teacher.

The educational ladder which has its lowest rung in the kindergarten and its higher steps in the universities and among advanced thinkers, includes, not quite a third of the way up, the high school.

Why must there be, at this point, such a complete interruption of a system so well begun? Why can we not substitute charts, relief maps, models and modelling, specimens of anatomy and natural history, manikins and pictures, for a large part of our present text books, placing the work table in place of the desk and the machine-shop in the place of the class-room, and pay, further, more attention to physical culture, more attention to the health, morals and manners of such students than these branches now receive?

In the present state of school education here such a move looks radical, even to an enthusiast; yet a sentiment in this direction is already being felt in the most progressive schools of our older states, lessening, thereby, the desire on the part of well-to-do parents to cut short the high school training of their children and place them where they can get a broader and more just education.

In conclusion let us hope that the time is not far distant when the selfhood within us will get more of a chance to assert itself, when the natural gifts which now lie latent within us may be encouraged to kinetic force and originality may conquer parrotism.

F. L. Washburn.

ON ACCIDENTALLY INTRODUCED FORMS OF ANIMALS.

Illustrations of the way in which exotic species are accidentally introduced into a country, have at various times attracted my attention.

Some years ago one of the local papers in an interior county of California, contained a paragraph giving an account of the discovery, by a resident of the place, of a small egg in a bunch of bananas. The egg, it was stated, subsequently hatched, and a *young alligator* made its appearance.

Of course the alligator conclusion was altogether absurd, and the mental picture of an alligator climbing a banana or any other kind of tree is highly amusing, unless the bunches of bananas in some parts of the world are considerate enough to come down and await the pleasure of Mrs. Alligator, etc., and afterward return to their proper places. It goes without saying that these large saurians do not climb trees or frequent tree-tops. Again, the eggs of these huge monsters are not small, but are about the size of a goose egg, though more cylindrical or elongated, and

are laid in the sand, as are those of the smaller allied forms generally, where they are hatched by the heat of sun, the same as the eggs of the turtles. The alleged alligator was simply a harmless lizard. I have found these small reptiles in Havana sugar, into which they had crawled, between the time of filling the boxes, in which this sugar is often packed, and the nailing on of the covers.

I remember of reading an item in a New York paper several years ago which gave an account of an Italian fruit vendor having been bitten by a tarantula. He was in the act of cutting a banana from a bunch on his stand when the insect, which was evidently hidden on the stalk of the bunch, stung him on the right thumb.

The peculiar arrangement of the stems of the banana, radiating in several series from a central stalk, and the clusters of the fruit being so compact, make an exceedingly favorable hiding place for small animals.

Not long ago the National Museum received a specimen of the peculiar slug Veronicella, which had been found by the giver in a bunch of bananas.

In 1866 or 1867 I received several examples of two different species of land shells belonging to the genera Bulimulus and Orthalicus, which were brought to San Francisco in a cargo of dye woods from the Gulf of California. The dyewoods had been hauled from the place where they were cut, and piled up near the embarcadero on the gulf shore, and afterward transferred to the vessel. These snails had crawled into the hollows and crevices of the wood, and were discovered when the cargo was unloaded and put on the wharf in San Francisco. When the sticks were thrown ashore the rough handling shook out the snail shells; many also were found in the hold of the vessel after the cargo was discharged. Though I obtained several specimens none of them were alive.

It may be presumed with some basis of probability that while in the majority of cases forms thus transported and introduced fail to gain a foothold 'and multiply and replenish the earth,' in these new regions, so far from their native haunts, where different environmental conditions exist, etc., yet, sometimes, occasionally, it is otherwise, and the stranger becomes acclimatized and established. That this is not an infrequent result in connection with the distribution of insect life, both in the mature and larval stages, is shown by the phenomenal appearance of some insect whose pestiferous habits forces the knowledge of its presence upon those who are damaged or annoyed by it, and who not only feel the habits or operations of the unwelcome alien deeply in their pockets, but are also stirred to the utmost limits of their wrath, by reason of their nearly fruitless efforts to circumvent its ravages.

An investigation of the effects of the disturbance of what may

be termed the faunal equilibrium that exists in Nature, by the intentional. incidental, or accidental interference of man, would prove to be not only an interesting and curious study in itself, but would show how intimately interwoven are the various forms of animal life, as well as animal and vegetable life, and further demonstrate the necessity of looking ahead to detect if possible what advantage or disadvantage may follow in the train of causes and effects, through the modification of the fauna of any region by the introduction and permanent addition of a new species, an exotic, strange and not to the region born. The rabbit pest in Australia is an appropriate illustration, where failing to look before the leap was made it has,to use an old-fashioned phrase,'cost a pretty penny,' and conspicuously indicates the practical value of a thorough and philosophical knowledge of natural history as related to 'the affairs of mankind.'' The absence of carnivorous predaceous animals in the faunal species of that region has simply, to use a common expression, made the rabbit ' master of the situation,' and it would seem as if it were likely to remain so.

Robert E. C. Stearns.

THE ORANGE FOR HEALTH, PLEASURE AND PROFIT.

The orange has well been called the Queen of Fruits, and is certainly deserving of that title in southern California. For more than a hundred years the crange has thrived in the genial climate with which we are favored, and throughout historic time this beautiful tree has paid tribute to mankind.

The history of the orange is intimately connected with romance and mythology, and not only has it been prized for its luscious fruit, but for its beauty of form, the fragrance of its blossoms, and other characteristics that commend it to the care of man.

The cultivation of the orange may be made profitable in any clime where the temperature does not fall below forty degrees F. in Winter. Seedlings are as a rule more hardy than grafted or budded stock, and are consequently to be preferred in the colder climates. Some varieties will easily stand a temperature that will prove destructive to others. The orange is now cultivated in most warm countries with success. California and Florida are the two states in the Union where they are most extensively planted, but Arizona and New Mexico give promise of taking a high rank in the production of this fruit. In all the Gulf States the orange is also planted to some extent, but usually more for ornament than for profit.

A deep, rich soil is required by the orange to insure a prolific yield of fruit and a vigorous growth to the tree. A stunted tree will not produce fine fruit. Yet, the orange tree is not very particular in regard to soil, but will grow luxuriantly in sand or very

inferior soils, if well manured and not stinted for water in the summer. The soil which it seems to take to most kindly, in southern California, is a reddish loam, consisting of disintegrated granite, such as forms a good proportion of our mesa lands near the coast. Some varieties will doubtless thrive better in the rich black loam of our larger valleys. The Japanese varieties are said to prefer a sandy or yellow clay loam, richly manured, in open ground or on a hillside, with a southeastern exposure. Valleys are colder and more liable to damaging frosts than the uplands, and therefore less adapted for orange planting. The soil should be kept moist, but not wet, as the tree will stand a considerable drouth.

The orange arrives at maturity at nine years or less from the seed. Seedlings will remain fruitful and profitable for over a hundred years, but grafted or budded trees are supposed to become unprofitable at half that age. The tree has been known to live and bear fruit for four hundred years, and a tree at Nice is said to be over six hundred years old. Some of the trees, planted over a century ago, around the missions of California are still living in spite of the neglect of fifty years. The experience of orange growers at Riverside, California, shows conclusively that an orange orchard may become profitable at four years. The navel orange will bear, under favorable circumstances, on an average two and one-half boxes per tree at four years from the nursery.

An orange grove of selected, carefully cultivated trees will yield a greater income, for the investment and current expenses, than almost any other horticultural industry. Unimproved orange lands, with water, at Riverside, California, are considered worth from $250 to $600 per acre, according to location, but in other sections can be bought at lower prices. The same lands improved are valued at $1,000 to $3,000 per acre, according to the size of the trees and other circumstances.

One hundred to one hundred and fifty trees may be planted to the acre, fifteen or twenty feet apart. Riverside orange growers generally prefer to plant twenty feet apart, as giving better and more lasting results. The expenses connected with cultivating an old orchard is estimated at not less than $35 annually, if properly cared for; and to secure the best results an expense of $25 additional per annum, for fertilizers, should be incurred. At present prices for California fruit an orchard five years old will yield from $200 to $400 per acre net. One box to the tree is a moderate estimate of the yield of the navel orange at the end of five years, and at the rate of one hundred trees to the acre the product would sell for $300 readily. At ten years of age an orchard will net as high as $1,000 to $1,500 to the acre. Such returns have actually been realized by more than one California orange grower, but $300 to $500 is probably nearer the average return to the producer. The industry, however, is still in its infancy.

The orange tree is commonly propagated in this country from the seed, and by grafting or budding. The tree can also be propagated from cuttings Seedlings are much more likely to produce fruit of a quality inferior to that of the parent tree, than fruit of an equal or superior quality; but the most of our superior varieties of oranges we owe to this tendency to sport. When a superior variety has been produced it is propagated by grafting or budding onto the roots of other seedlings. The Chinese have a curious method of propagating desirable varieties. 'A branch of the diameter of four or five inches is chosen, around which a circular incision is made. Around this straw matting is wound in the shape of a funnel, and filled with beaten earth. Roots soon begin to push, and by the following season it is provided with sufficient to support it when detached from the parent stem. The young tree thus obtained often bears fruit at the end of two or three years.'

Pruning of the orange tree is denounced by some growers, but the more experienced advocate the inteligent use of the shears, for the shaping of the tree,for the removal of dead wood, or branches growing in the wrong direction, projecting limbs or those touching the ground, and for the removal of the small branches and suckers which choke up the inside of the tree, excluding needed light and air, and forming dangerous places for the multiplying of injurious insects.

An ideal orange tree, at eight years of age, may be described as twelve feet high, symmetrical in shape, with limbs projecting evenly on all sides, about eight feet in diameter; of compact growth, the dense foliage hiding the larger limbs, and the trunk visible for about a foot above the ground. To secure an ideal tree some pruning is necessary at times, but should be very sparingly indulged in and not overdone. Too little is better than too much pruning. The early spring is conceded to be the best season of the year to do the heavy pruning. They may be lightly trimmed at other seasons as they need the attention.

The yield of the orange tree is very great. The usual yield is 600 to 1,000, sometimes, but rarely, as high as 6,000 to the tree. 'In Malta and Naples as many as 15,000 oranges have been picked from a single tree; in the Sandwich Islands a tree was estimated to bear 20,000 fruits; while 33,000 oranges have twice been reported from one tree in southern Europe!' The tree comes into bearing at three to five years of age from the seed, in some places arriving at maturity much earlier than in other countries. The yield at Riverside, California, per tree, in merchantable fruit, has been given as follows: Ninth year from seed, half box; tenth year, one to three boxes; eleventh year, one to five boxes; twelfth year, same; thirteenth year, three to five boxes; fifteenth year, six to eight boxes; with an average increase of a half box thereafter up to the twentieth year. The fruit has sold at from $1.40 per box on the tree, to $6 per box, according to quality and season.

The orange was highly esteemed by the ancients for its medicinal qualities—a fact which seems to be lost sight of by the present generation. In cases of fevers and malarial complaints this delicious fruit is more useful than drugs, and is often very helpful in alleviating the ills of mankind. A prominent physician once remarked that were his patients to eat an orange or two every morning, they would require but little medical attention.

In France immense quantities of orange blossoms are annually consumed in distilling orange-flower water. One firm alone is reported as using 350 tons of the flowers for this purpose in a single season. Tons also are candied green. Neroli, so much used by perfumers, is extracted from some varieties. Curacoa is manufactured from dried orange peel. The leaves are frequently used as a substitute for tea, in health as well as in cases of sickness. Thus, it will be seen, that the fruit is not the only useful product of this handsome evergreen tree.

Citrus aurantium is the botanical name of the orange of commerce, but there are several other species now known, and hundreds of varieties are in cultivation. Among these varieties the following may be considered as having been received in California with the greatest favor, among growers for profit.

WASHINGTON NAVEL.—Originated in Bahia, Brazil. Generally considered the most profitable orange for the market, ripens early, commences to bear at one year from the bud, prolific, the fruit large, solid, heavy, skin smooth, of very fine texture. Fruit very juicy, highly flavored, with melting pulp sweet, seedless. The tree is a rapid grower, but does not attain to a large size.

MEDITERRANEAN SWEET.—One of the very best, introduced from the region of the Mediterranean sea, a regular and heavy bearer, ripens late, and generally very evenly. The tree grows to medium size, and thornless. Fruit medium to large, pulp and skin of very fine texture, solid, few seeded, richly colored deep orange. One of the most delicious of fruits, and well worth planting on a large scale.

TAHITI SEEDLING.—A large tree and a good bearer, one of the most profitable oranges grown after it comes into full bearing. Will yield twelve to fifteen boxes per tree when from fifteen to twenty-five years old. Fruit can be shipped the first of February, but can be left on the trees without injury until the first of June.

JOPPA.—A vigorous, thornless tree, from Palestine. Fruit large, firm, nearly seedless, rind thin, pulp very fine, sweet and juicy, of a deep red color. Can be marketed early or late without deterioration in quality. Not generally known. Some call it the Jaffa orange.

TANGERINE OR KID GLOVE.—A dwarf, symmetrical tree, of a weeping habit. Fruit small, deep red, very sweet and aromatic. The rind, when ripe, is very easily separated from the pulp, hence is called the "Kid Glove orange."

ST. MICHAEL.—The 'paper rind', is a small, round orange, very firm and juicy, and with very thin pale-colored skin. Ripens late, keeps well on the tree, and does not drop when mature. This orange is from the Azores. The tree is dwarf, and a prolific bearer. The Azorean St. Michael is a larger tree, a rapid grower and very prolific also. The fruit ripens early. keeps well on the tree, few seeded. larger than the 'paper rind' St. Michael, solid, flattened in shape. The pulp is fine and melting and the rind medium thin.

The Washington Navel, the Mediterranean Sweet, the Tahiti Seedling and the St. Michael are the four varieties which those of widest experience recommend most highly for extensive planting, as sure to be standard varieties in the market for years to come. Other varieties are either little known or more curious and ornamental than profitable.

Among the numerous varieties which have been tried or are being tested, the following are some most worthy of notice or most prominent. The descriptive notes of the above varieties and the following are freely compiled from various reliable sources, as the writer is not personally familiar with them all.

WOLFSKILL'S BEST.—Considered identical with the Tahiti Seedling.

KONAH.—Fruit large, rough and thick skin. Tree very thorny. Ripens early. Raised in California from seed grown in Konah Island, and has few, if any, good qualities to recommend it for cultivation.

KING.—A Chinese monstrosity; highly flavored, medium-sized fruit, with rough rind. Ripens late.

OONSHIU.—This Japanese dwarf is very hardy and ornamental, producing small, flattened fruit, of exceedingly fine texture, sweet and seedless, the rind easily detached. Wrongly called the Satsuma orange. Not likely to prove of any great commercial value. A prolific bearer, of a drooping, willowy habit, and very hardy, as was proved in Florida in the great freeze of 1886. Probably one of the most useful of the many varieties of Japanese oranges.

KUMQUAT.—The very small, oblong or olive-shaped fruit of this bushy tree is peculiar in being edible throughout—rind and all. The rind is thick, yellow, smooth, and sweet-scented. The pulp contains many seeds. Prolific, but more odd than useful, as there is very little pulp about the fruit. Other ornamental varieties are the following:

MANDARIN.—A very ornamental tree. Fruit red, flattened at the ends.

POMELO OR GRAPE FRUIT.—Fruit very large, from two to five pounds each in weight, pale yellow, resembling the citron. Skin smooth, juice sub-acid. A variety of shaddock.

SHADDOCK.—Tree dwarfish, ornamental. Fruit very large,

with smooth skin, pale yellow and very glossy. Rind thick and spongy and very bitter. Ornamental only.

BOUQUET.—The large and fragrant flowers are of commercial value, as also in the following species. Fruit very bitter.

BERGAMOT.—Fruit large and rough, flattened, ornamental only. Grown for the blossoms.

The oils of Neroli and Bergamot are expressed or distilled from orange blossoms. The fragrance of orange blossoms is very agreeable, and is thus utilized by perfumers. In the poetic language of flowers the orange blossom is the emblem of chastity, and is the recognized bridal flower among English speaking people.

The question as to whether there is danger of over-production is always to be heard in connection with any industry, long before the market is nearly supplied. Nearly five million bushels of oranges were imported into the United States in 1884. Southern California exported in 1890 nearly 3,000 carloads of this favorite fruit. The quality of our California oranges is recognized as superior to the product of Florida or of the foreign importations. That there is or ever will be any danger of an over-production of a fine quality of fruit need not be entertained for a moment. The product of the 6,000 acres under cultivation at Riverside, in 1890, realized for citrus fruits (oranges and lemons) one million dollars, and for raisins and other dried fruits half a million dollars—a handsome income for any community. While it cannot be hoped to maintain the present profits of orange culture for all time, yet no diminution need be feared for years to come, and the industry is likely to continue one of the most profitable among horticultural pursuits.

Success requires careful judgment in many directions. Of primary importance is the selection of the site of an orange orchard, with suitable soil. Care in the selection of the best trees is of second importance. The planting requires dexterity and careful management, and May is recommended by some as the best month in southern California for this work. Cultivation, irrigation and fertilizing are other subjects which demand attention—and the details of each of these subjects would each require a volume for their proper presentation. And last but not least is it desirable to be posted on the useful and injurious insects which aid or hinder the horticulturist, as well as a knowledge of fungous or other diseases which may beset the orange. The orange, for health, pleasure and profit, however, can scarcely find a rival among the fruits of the earth. *C. R. Orcutt.*

WALDEMAR G. KLEE.

W. G. Klee, late Inspector of the Agricultural Experimental Stations in California, died in the early part of February, of consumption, in his thirty-eighth year. He was born in Copenhagen,

Denmark, where he was educated in horticultural arts, and where his brothers and sisters still reside.

He came to America when about nineteen years of age, and secured employment in a public park in Chicago. About fifteen years ago he came to California. Attending the State University at Berkeley his ability was recognized by Prof. Hilgard, and he was given employment on the experimental grounds of that institution.

Mr. Klee was appointed to collect and arrange the living plants of California at the New Orleans Exposition, and made that feature a credit to the state. In 1886 he was appointed State Inspector of Fruit Pests by the State Board of Horticulture. In 1889 he was appointed Inspector of Experimental Stations in the state, which position he was later compelled to resign on account of his health.

The horticultural writings of W. G. Klee are widely and favorably known, and have mainly appeared in the reports of the University of California, of the State Board of Horticulture, and of the U. S. Department of Agriculture, aside from contributions to the horticultural press of the day.

In 1885 Mr. Klee married Miss Jennie Barry who, with three children, survives. His death occurred at his ranch near Santa Cruz, where he had retired in hopes of regaining his strength through an out-door life.

THE FOREST TREES OF OREGON.—II.

In the firs (Picea), the cones are upright, and in the distance they are sometimes mistaken for birds perched on the limbs.

PICEA GRANDIS or Western Balsam Fir, or Abies Grandis or Oregon White Fir is found at its best along the shores of the Willamette river and its tributaries, but is widely dispersed along the mountain slopes of both ranges. Its commercial value falls below that of several other trees. It is conspicuous along our river bottoms for hight and beauty. It is easily transplanted.

PICEA NOBILIS—Noble Fir. This fine fir is at home in places remote from mills and railroad lines, and therefore does not figure much in commerce. Extensive groves of it may be seen among the Coast mountains where prostrate trees 200 feet in length are not rare. As an ornamental tree it well deserves its name of noble, and it is easily transplanted. It also has a large handsome cone.

PICEA AMABILIS. Cones are dark purple. This, too, is out of the reach of commerce; abundant along the summit of the Cascade mountains. This is a very handsome tree for landscape gardening.

THUYA GIGANTEA—Western Arborvitæ. This is the white cedar of North Oregon and of Washington. It is a grand forest

tree; is durable, easily worked as finishing lumber and highly prized for its lightness. The northern Indians build their largest canoes of it and use its bark for mats and cordage. In the southern portion of the Willamette valley it is called the smooth-barked cedar, to distinguish it from Libocedrus.

LIBOCEDRUS DECURRENS—Rough-barked Cedar or Incense Cedar. As a tree for lumber this is inferior to the Thuya. It does not grow farther north than Lane county. It is abundant throughout Douglas and Jackson counties.

THE LAWSON CYPRESS—Port Orford Cedar (Chamaecyparis lawsoniana) is not found north of the Umpqua river. It is at its best around Coos Bay and the Coquille river and the north slopes of the Siskiyous. It is called white cedar; is shipped extensively for the California market. So completely marketable is this tree that one may see on the Coquille the finest example of lumber economy: The log is cut into boards and squared timber, the slabs into pieces for broom handles and lath, and the scraps into blocks for matches; and it deserves this fine economy of material. As a tree for landscape gardening it is questionable whether North America has a finer tree than the Port Orford cedar. It is at its best along the northern slopes of the Siskiyous. It is easily transplanted, will grow in a wide range of climate, and will teach any one to love a tree.

JUNIPERUS OCCIDENTALIS. In many of the dryer regions of Central Oregon this juniper, under the name of cedar, furnishes the chief and often the only supply of firewood. It is not abundant enough for extensive commercial demands. It strongly resembles the red cedar of the Eastern States (Juniperus virginianus).

JUNIPERUS COMMUNIS. A stranger to this species seeing it for the first time experiences marked surprise. It is entirely prostrate, often growing over a space 100 feet square, the stem five or six inches in thickness. One could readily imagine many situations in landscape gardening in which such a plant would fill a want. It is often met on the coast.

TAXUS BREVIFOLIA. The Oregon yew has a dense, durable wood, often used in western Oregon for fence posts. It is not abundant enough for commercial purposes. It is a handsome tree, pays for transplanting in the beauty it adds to a lawn.

LARIX OCCIDENTALIS.—Oregon or Western Larch. This is a much larger tree than the tamerack of the Eastern States. Its timber is good. It is at home along a belt of foothills from the Upper De Chutes north into Washington, and abundant in the Blue mountains but not in western Oregon. Excepting this larch, all the foregoing trees are evergreen.

We will now consider the deciduous trees that rank as valuable for shade or ornament as for commerce. Oregon has three oaks that are of commercial importance. Of these in abundance and quality, the Oregon white oak ranks first.

QUERCUS GARRYANA (Oregon White Oak). This seems at its best in the Willamette valley and along the Columbia river. For years past a large amount of this timber has been shipped to San Francisco, and well authenticated cases have occurred of its being returned to Oregon as Eastern oak for our wagon builders.

QUERCUS KELLOGGII—Black Oak—Kellogg's Oak. This handsome oak is found no further north than Lane county, but grows abundant in southern Oregon. I have not seen it in central Oregon. It is at its best in Douglas and Jackson counties. It is a much handsomer tree than the white oak, but its timber is not so good.

LIVE OAK—Quercus chrysolepis. This tree is often used for wagon timber along the western slopes of the Siskiyous but is scarcely abundant enough to more than supply home want.

Thomas Condon.

REMARKS UPON THE STENINI OBSERVED IN SAN DIEGO COUNTY, CALIFORNIA.

Among the Microcoleoptera, neglected by the majority of collectors, is that extremely interesting tribe of the Staphylinidæ—the Stenini. The insects of this group are generally minute, varying between 1.7 mm. (Stenus atomarius) and 5.5 mm. (Areus annularis).

They are to be sought for about the roots of plants; beneath decaying vegetable matter, and debris cast up by the water, along creek and river banks. They are generally abundant about all permanently moist places. Rarely have I taken them on the wing.

They are readily recognized by their dark color, Mantis-like attitude, prominent eyes, abdomen decreasing rapidly in width from base to apex, and by their peculiar movements—running with varying speed in the different species, for short or long distances, then pausing for a time.

They are said to be carnivorous in their habits, and my observations thus far confirm that statement; but not by abundant proof. On one occasion while searching about the roots of a partly broken down shrub, I discovered one with a small green aphid in its jaws, that I had probably dislodged while disturbing the plant.

The species thus far collected in San Diego county are four in number, but they are by no means the sum total of those that can be taken. They can be collected from May to December, but are most abundant during the months of June, July, and August. The species are as follows:

STENUS SCULPTIL, IS Casey.—A distinct form, and varying in length from 3.9 mm. to 5.2 mm. Decidedly robust. Pubescence

on abdomen visible, giving a silvery and fulvous ornamentation. Surface of prothorax and elytra, rough. The transverse tricuspid carinæ of abdomen distinct. This species is readily differentiated from any of its congeneric associates. It is abundant at Poway (elevation 700 feet), and I have not taken this form elsewhere, although its geographical distribution is quite extensive, occurring in Washington, Oregon, Nevada, and northern Lower California.

STENUS PACIFICUS, Casey.—At first glance this species closely resembles S. arizonæ, but a careful examination and comparison cannot fail to readily distinguish between the two. In length it varies from 2.2 mm. to 3.0 mm. In form, moderately slender. Pubescence not appreciable. Prothorax is narrower than long, with anterior and posterior margins equal. Prothorax and elytra irregularly and moderately punctured. Surface polished. Taken along the San Diego River in considerable numbers. I have not taken this species at Poway, yet it may occur there. At the present state of our knowledge of its distribution it appears to be peculiar to Southern California.

STENUS ARIZONÆ, Casey. — More robust than the preceding species. Length, 3.0 to 4.2 mm. Prothorax wider with margins strongly arcuate. The traces of channels upon pronotum and elytra aid greatly in separating this species. Abundant along the San Diego River, in company with S. pacificus, and is recognized by its darker color—surface not being polished. These two species *seem* to be the characteristic species of the coast region, not having found them in company with the species of the interior. Probably it is irregularly distributed, for it occurs in Arizona and Texas.

AREUS PINGUIS, Casey.—I have found this species associated with S. sculptilis in the Poway region. Very robust in form. Contrasting strongly with its associate species by its fine, closely placed, and evenly distributed punctures. In length this species varies but little, being close to 4.0 mm. in all specimens measured. Distributed over an extensive area; according to Thos. L. Casey, it occurs in British Columbia, Washington, Oregon, Nevada, Colorado, besides California.

The consideration of the local distribution of species that have such an extensive range, may seem unprofitable, but as a species may be very abundant in well defined localities, and entirely absent in an adjoining region, my notes may not be without value in pointing out the possibility of *irregular distribution.*

It is strange that during many years collecting at Poway and vicinity that S. pacificus and S. arizonæ should have escaped my notice, while S. sculptilis and A. pinguis were abundant; and that during the past season I should fail to obtain the two latter species in the San Diego River region, where the former species were plentiful. Granting the possibility of *regular distribution*

or error in observation, the question would then be explicable either upon the hypothesis of unfavorable conditions for the maintenance of the species in certain localities at certain periods from deficient food, epidemics, or preponderance of natural enemies; or, in the case of error, time for the correction of the same.

As any one of the causes mentioned is competent to account for the absence of the species from the localities, I shall have to rely upon time to point out the *vera causæ*—be it the natural distribution, absence of proper food, epidemics, influence of natural enemies, or error in observation.

The larvæ of any of the species enumerated are unknown to me. Pupæ of S. sculptilis have been observed, but unfortunately I neglected to preserve any of the specimens. In color they were milky white, elongate and but slightly curved. They pass through their transformations in the soil, near the surface. I have not observed any cocoon more than the cavity formed in the soft leaf-mould, beneath the prostrate plants and decaying debris along water-courses. *Frank E. Blaisdell.*

CORONADO, February 16, 1891.

THE MORNING GLORY BUSH, IPOMÆA LEPTOPHYLLA.

What brilliantly flowered shrubs! How beautiful! Great masses of them, here and there, glorify the early morning of the Colorado plains. The landscape for miles is, in some places, beautified by these large mounds of crimson flowers amid their bright green leaves.

It is indeed a morning glory that does not twine; but, instead, grows in large shrubby clumps three or four feet in diameter and almost as tall as broad. However, it is an herb and not a shrub; for in winter no trace of it is to be found above ground, except perhaps the dry and withered twigs of the previous summer. Underground, its dimensions are enormous; for it has an immense roundish root that stores up sufficient nourishment so as to enable the plant to make a growth in early summer rivalling that of Jack's famous bean stalk.

The flowers are numerous and larger than an ordinary morning glory; the leaves are long and narrow, glistening in the sunlight. Certainly the plant would well repay cultivation and seems especially adapted to the open lawn where a single plant when well grown would take the place of a whole bed of flowers.

Alice Eastwood.

GEM ARROW POINTS

(From the *Great Divide*, March, 1890.)

Nearly everyone is more or less familiar with the common flint arrow and spear heads turned up by the plow or dug from the mounds of the ancient red men or aborigines of America; but

comparatively few are acquainted with the tiny arrow heads of certain localities of the west. Thousands of farmers' boys have gathered the flint forms from the soil of the farms over which they roamed, but the little semi-precious stone points are seen in the east only as purchases from some western collector. For delicacy of point and barb, perfection of workmanship and beauty of material, few of the flints compare favorably with these chalcedony, agate, jasper and obsidian gems of the west. Archæologists well versed in the study of this science profess to tell us the manner in which these stone instruments were made. Of all the weapons made from stone these delicately formed arrows have created in my mind more grave doubts regarding the correctness of some of the advanced theories of the great students of American archæology than all of the coarser material that has come under my observation.

I have seen hundreds of Oregon gem arrow points so delicately constructed that they seemed to preclude the idea that they could have been struck the gentlest blow with any chipping tool of stone, antler, or what not, and have preserved the sharp and slender points and barbs that gave them uniqueness or variety. I am more and more impressed with the thought that the mode of making these small arrow heads is a lost art. None of the oldest Indians of the western coast can give any information upon the subject.

The most noted localities for these small arrow points are Oregon, Washington, New Mexico and Nevada. A few small points are occasionally found in Arizona, Colorado and Montana. A greater number have been found upon the east bank of the Willamette river, Oregon, from one-half mile above to one-half mile below the falls of the same name, upon an area of about five acres—one acre being at the south extreme and the other four acres at the north extreme of this one mile of river bank.

From the vast quantity of flakings found upon the former area we are led to the conclusion that the Indians had 'ancient arrow makers' stationed there. The favorite dwelling places of the red men were on the rivers near their mouths, or where natural obstructions made good fishing points. It is estimated by an old collector who has personally collected 35,000 of these gem arrow heads and purchased nearly as many more since 1878, that 20,000 have been gathered from the one-acre spot and over 100,000 from the four acres of ground above mentioned. At the latter place is found a stratum of dark soil two and a half feet in thickness, composed of charcoal animal bones, fresh water clams, shells, etc. Above the dark stratum is a layer of wash sand two feet thick, indicating one or more higher floods than we have any record of. From these facts, and from the fact that there is nothing on the ground to indicate a burial place, I draw the conclusion that a very ancient village of these aborigines existed here and remained a long time. The tribes living near the locality in

question are said to have been the Molalla, Clackamas and Klamath Indians.

What may seem stranger still, the fine material from which these arrows were made does not exist at or near the site of this village. Excepting petrified and agatized wood, the stones to make these arrow points were brought a considerable distance, and obsidian is not found nearer than 325 miles distant. Few large points worthy the name of spear are found here. The majority of arrow heads found are of the little, delicate points. The most prolific successes of the arrow seekers have been in the spring when the freshets have washed the sand loose upon the overflowed banks of the Willamette and upon recedence left in sight many new prizes to gladden the eye of the relic hunter.

L. W. Stilwell.

BRODIÆAS.

(From *Garden and Forest*, III, 636.)

The range of this genus is almost as wide as that of Calochortus. California has most of the species; Oregon, Nevada and Utah have some representatives; northern California is the home of the greater number. A few of the Brodiæas are sometimes found in sandy soil. B. terrestris always is, B. ixioides occasionally and B. laxa in depauperate specimens. I have also received bulbs of some Brodiæas unknown to me from the Sage-brush sand of Nevada and Utah. B. capitata and Brevortia coccinea luxuriate in the debris of loose rock and mould on the hill-sides, and the remaining species are natives of clay soils from light to heavy; B. stellaris, B. congesta, B. multiflora in lighter, and B. grandiflora, B. minor, B. laxa, B. ixioides and B. lactea on rich clay or wash soils. B. peduncularis is found in the sand and mould in the beds and along the sides of living streams. All Brodiæas are lovers of water, while the last named species grows in situations where water is standing or dropping continually during the winter. The finest growth of B. grandiflora or B. ixioides I have ever seen was where winter streams broke over ledges of large loose rocks. The bulbs were in the rich mould in the interstices and catches, and subject to a drip of water until the blooming season, and after that became dry. On the sunny sides of the deep precipitous cañons, where the loose soil rock and leaves have slid down to the bottom of the slope, often growing on low underbrush, which its flower-stalks overtop, B. coccinea, the Vegetable Fire Cracker, grows most luxuriantly. In such situations stalks five feet high, and bearing from fifteen to thirty blossoms, are not unusual. B. capitata delights in similar soil, but in a sunny exposure. Stropholirion californicum, or B. volubilis, a singular species in which the flower-stalks twine around any supporting object, delights in a soil like that suited to B. capitata in underbrush.

So much for natural conditions. I have perfect success with

Brodiæas in shallow boxes, the same as described for Calochortus. For a covering I use clay and chip soil. With B. grandiflora, B. capitata, B. coccinea and B. stellaris rich soil scraped from a wood-yard proves excellent covering. With others clay loam, with various mixtures, with chip soil, have been tried, and the bulbs thrive in all of them. In boxes one will hardly use too much water until the blooming season, when moderate moisture only is required, after which the plants should be dried off. They should be planted shallow—four inches is deep enough—and they need abundant sunlight. Here all are perfectly hardy, and I am satisfied that with slight winter protection they will prove so in the Eastern States. *Carl Purdy.*

THE YELLOW-HAIRED PORCUPINE.

A very large and fine specimen of Erethizon epizanthus, one of some eight or ten individuals which have been taken in Lane county, Oregon, during the past decade, has recently been brought to me for preparation. The animal was covered on the upper parts and sides with a dense growth of short spines, becoming thinner and merging through thickened spinous hairs to coarse bristles on the sides, and especially on the inferior caudal surface. On the under portions of the limbs, as well as the medial portion of the belly and the muzzle there were no spines.

Under fur rather soft, dark sooty-brown, almost concealed by the spines and bristles, which latter are in some parts six or even eight inches long. The bristles in this specimen seem to differ from Brandt's type by being penultimately tipped instead of extremely tipped with greenish yellow, the yellow in this individua being displaced at the tips by the prevailing color of dark brown in nearly all the bristles. The spines are greenish yellow tipped with dark brown. Brandt described the extreme bases of the bristles as yellowish, while in this specimen the yellow extended at least one-fourth the entire length of the spines, or in some of them two inches from the base.

This porcupine lives in burrows formed in the ground by itself, is nocturnal in habits, and strctly herbivorous, the teeth being admirably formed for a vegetable diet. Formula of the teeth: incisors, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{4-4}=20$.

They are reputed to be quite destructive in gardens in some places, but are too few in numbers in this region probably to become greatly noted in this particular. The ruthless war waged upon them by man—almost their only foe after reaching maturity—reduces their number every year. *Aurelius Todd.*

Miss Alice Eastwood, of Denver, Colorado, the present Secretary of the Colorado Biological Association, has been extending her acquaintance with flowers by a botanical excursion through southern California.

C. LUTEUS *Dougl.* Plant low, with clear lemon yellow flowers.

C. MACROCARPUS *Dougl.* Stout and tall, the lilac flowers banded with purple.

C. NUTTALLII *T. & G.* Tall, flowers large, of a creamy whiteness, banded with green on the back of the petals. A strong growing plant.

C. LEICHTLINII *Hook.* A low mountain form of the last.

C. PALMERI *Watson.* Rose purple flowers, with maroon purple spots at base of petals.*

C SPLENDENS *Dougl.* Lustrous rose purple, with often a maroon purple spot at base of petal*. Greatly admired.

C. VENUSTUS *Benth.* Regarding this species, considerable confusion exists relative to the nomenclature of the numerous beautiful varieties. The following are the leading varieties known in cultivation, the first being considered the type of the species.

1—Roseus. Creamy white inside, with rose-colored blotch at top of petal, a beautiful tinted eye in center, and silky gland at base; rich carmine on back. A perfect gem.

2—Citrinus. Citron yellow.

3—Oculatus. White inside, with richly colored eye-like spots.

4—Purpurascens. Rich purplish lilac, with eye-like spots.

C. WEEDII *Wood.* This is one of the finest of the Mariposa Tulips, two or three feet high, producing several large and brilliant orange yellow flowers, delicately dotted with brown and covered with silky hairs. Peculiar to Southern California.

II.—STAR TULIPS.

The Celestial or Star Tulips differ from the Mariposa Tulips in the slender drooping stems, bearing many bell-shaped or globular flowers. A single long glossy leaf is characteristic of both sections of the genus.

C. ALBUS *Dougl.* A strong growing plant, with pearly white globular flowers. often an inch in diameter, lined with silky hairs. Very beautiful.

C. BENTHAMII *Baker.* Bearing two to six delicate nearly erect open bells, yellow, lined with silky hairs.

C. FLEXUOSUS *Watson.* Petals clear lilac.

C. LILACINUS *Kell.* Erect cup-shaped flowers, light lilac.

C. MAWEANUS *Leichtlin.* Delicate open bells, white lined with silky blue hairs.

C. NITIDUS *Dougl.* A foot high, white or purplish flowers.

C. NUDUS *Watson.* Low and often slender, white or pale lilac. wholly without hairs

C. PULCHELLUS *Dougl.* One of the hardiest and most beautiful species, resembling C. albus, but with rich yellow flowers.

C. UNIFLORUS *H. & A.* Large white flowers.

CALYCANTHUS.

C. OCCIDENTALIS *H. & A.* Sweet-scented shrub. An erect shrub, ten feet high, dark green foliage and purplish-red or white flowers. Deciduous.

CAMASSIA.

The Camass furnished to the Californian aborigine one of his most valued articles of food, and to the white man it contributes a handsome flower. The Camassias are perfectly hardy in the eastern states. They thrive best in a porous soil.

C. CUSICKII *Watson.* The flowers of this species, borne in a long raceme, when first expanded are white, changing to pale blue after they have been open a few days. Nearly a yard high at maturity; bulbs large. 'Finest of the genus.'

C. ESCULENTA *Lindl.* The Indian Kamass grows from ten to twenty inches high, has long grass-like leaves, and bears a loose spike of violet-blue flowers, five inches long. The flowers are an inch or more wide, ten to twenty in a spike. and useful for cutting.

CARPENTERIA.

C. CALIFORNICA *Torrey.* An ornamental shrub related to the syringa, with fragrant white flowers.

CASTILLEIA.

C. AFFINIS *H. & A.* Painter's brush. A stout annual one to three feet high, abundant along moist banks of streams in Southern California, where the yellowish flowers tipped with red, in a leafy spike, and with bright red floral bracts, renders the plant very striking and conspicuous.

C. FOLIOLOSA *H. & A.* A perennial, one or two feet high, shrubby at base, clothed with a matted white wool. The inconspicuous yellowish or red tipped flowers outshone by the brilliant red of the floral bracts. Flourishes on dry hillsides.

CEANOTHUS.

The Wild Lilacs of the Pacific Coast are in endless variety. They are mostly graceful evergreen shrubs or small trees, bearing dense showy racemes of either blue or white flowers.

C. HIRSUTUS *Nuttall.* This is one of the most graceful of our Californian shrubs, with glossy foliage and bearing a profusion of campanula-blue flowers which fade to flax-flower and pearl blue.*

C. DIVARICATUS *Nutt.* Pale glaucous leaves, and light blue to white flowers. Very ornamental.

C. INTEGERRIMUS *H. & A.* Bears large open terminal racemes of white fragrant flowers.

C. ORCUTTII *Parry.* Flowers unknown. Native of the high mountains, of San Diego county.

C. THYRSIFLORUS *Esch.* Sometimes a small tree, with bright blue flowers. One of the best known in cultivation.

CEREUS.

Cereus includes over 200 species of the most beautiful cacti, the most of them producing an abundance of brilliant colored or exquisitely tinted flowers. Some are delicate trailing plants, others are erect and rigid, in the giant cactus attaining a height of sixty feet. Many of the species are beautiful and curious in themselves, not needing to blossom to repay the attention bestowed upon them.

C. EMORYI *Engelm.* The Velvet Cactus is a cylindrical species covered with slender yellow spines, when young so soft and flexible as to suggest its popular name. The flowers are greenish yellow, not showy. In the United States only found near San Diego.

C. ENGELMANNI *Parry.* One of the most beautiful of the Cushion Cacti, with long white or rich brown spines, growing in clusters of few to many cylindrical heads a few inches tall, and bearing numerous large and bright magenta colored flowers. The fruit is edible, an inch in diameter, possessing the flavor of the strawberry.

C. GIGANTEUS *Engelm.* The Giant Cactus is the largest species known. Attains to a height of sixty feet, bearing large flowers and edible fruit.

CHAENACTIS.

C. ARTEMISIAEFOLIA *Grav.* A viscid-pubescent annual, one to five feet tall, bushy, with white or flesh-colored heads of composite flowers, an inch in diameter.

C. TENUIFOLIA *Nuttall.* An erect or decumbent annual, a span to a foot high with composite heads of flowers an inch across, of a lemon yellow approaching orange in the center.* A coarse but rather showy plant, like the preceding, remaining long in flower.

CHAMAECYPARIS.

C. LAWSONIANA *Parlat.* The Lawson Cypress is one of the most beautiful of the many native trees of the Pacific Coast, and is highly valued for its ornamental qualities. It sometimes attain a height of 150 feet.

CHILOPSIS.

C. SALIGNA *Don.* The Desert Willow is a graceful willow-like shrub, related to the Catalpa, with showy white flowers two inches long, veined with purple.

CHLOROGALUM.

C. ANGUSTIFOLIUM *Kellogg.* Flowers white with yellowish-green lines.

C. PARVIFLORUM *Watson.* Flowering stems from six inches to six feet tall. Flowers not showy.

C. POMERIDIANUM *Kunth.* The common Soap plant or *Amole* produces a large, spreading panicle of rather inconspicuous white purplish-veined flowers from an immense fibrous-coated bulb which is sometimes used as a substitute for soap.

CLARKIA.

C. ELEGANS *Dougl.* A showy, profuse flowering annual, six inches to several feet high, of rich purple and other colors. The following varieties have been produced by cultivation.

1—Alba. With pure white flowers.
2—Alba flore pleno. Double white flowers.
3—Rosea. Rose-colored flowers.
4—Rosea flore pleno. Double rose-colored flowers.

CLAYTONIA.

C. PERFOLIATA *Don.* A succulent annual, with small white or rose-colored flowers. In England it is considered very fine for salad, while in California it is known as Spanish Lettuce.

COBAEA.

C. SCANDENS *Cav.* A Mexican climber of the phlox family, highly valued as a rapid grower and for its large bell-shaped flowers, of an apple green color when first opened, changing to lavender and violet and finally to a rich prune purple.* A tall climber.

COLLINSIA

Tender annuals, commonly two-colored in their wild state, very pretty.

C. BARTSIAEFOLIA *Benth.* Purplish or pale violet flowers.

C. BARTSIAEFOLIA ALBA. A cultivated white variety, rarely found wild.

C. BICOLOR *Benth.* The most showy species, with purple and white flowers, three-quarters of an inch long, in large whorls. The following are the leading cultivated varieties.

1.—Alba. Lovely white whorls.
2.—Atrorubens. A pretty purplish-red variety.
3.—Candidissima. A very pretty dwarf white form.
4.—Carnea.
5.—Rosea.

COLLOMIA.

C. GRANDIFLORA *Dougl.* An erect annual related to the Gilias, a foot or two high with large showy salmon-colored flowers.

CUPRESSUS.

The California species of Cypress are among the most widely planted of evergreen trees or shrubs, and are very ornamental. The Monterey Cypress is especially useful for hedges. (The Lawson Cypress belongs to the genus Chamaecyparis.)

C. GOVENIANA *Gordan.* Usually a low bushy shrub or tree.

C. GUADALUPENSIS *Watson.* The Blue Cypress is one of the most ornamental species in the genus. Tall and graceful with fine glaucous foliage, and of a dense compact growth.

C. MACNABIANA *Murr.* A graceful little tree, rarely over ten feet high.

C. MACROCARPA *Hartw.* The Monterey Cypress. Said to resemble the Cedar of Lebanon in habit, with dense far-spreading branches.

DARLINGTONIA.

DARLINGTONIA.

D. CALIFORNICA *Torrey.* A striking perennial plant of curious aspect. Of greenish yellow hue, bearing a nodding purplish flower. One of the Pitcher plants, noted for its alluring insects to their destruction.

DATURA.

D. METELOIDES *DC.* A rank growing plant, with large white flowers delicately shaded with violet. Very handsome in cultivation, but a common weed in California.

DELPHINIUM.

The larkspurs scarcely need an introduction, so many species having met with kindly reception. California, however, has the honor of having contributed several of the finest species yet introduced into general cultivation.

D. CARDINALE *Hook.* A stout perennial, five to seven feet tall, producing magnificent panicles of bright, handsome scarlet flowers with a yellowish center. Quite hardy.

D. DECORUM *F. & M.* A foot high, with a long spike of brilliant indigo blue flowers. Very fine.

D. NUDICAULE *T. & G.* Flowers in spikes a foot long, light scarlet to crimson.

DICENTRA.

Glabrous perennials, usually showy, with pinnately divided leaves and racemes or panicles of brilliant flowers.

D. CHRYSANTHA *H. & A.* A most generous plant, continuously in bloom from May until October. The small rich lemon yellow* flowers borne in a terminal panicle a foot or two long; the plant two to four feet high, very effective for grouping in borders; the finely divided foliage resembling some ferns, of a very pale bluish-green and very beautiful. Roots easily transplanted in the fall or winter, or the plant may be grown from seed. Grows wild on dry hills, but thrives in rich garden soil.

DODECATHEON.

The Giant Cyclamen, Dodecatheon Clevelandi, is one of the most charming of the many lovely spring flowers of Southern California. Every child in springtime is sure to gather large handfuls of the fragrant flowers, and each has some pretty name for them such as Rabbit-ears, Shooting-stars, or Mad Violets. The flowering stem is usually a foot high, bearing an umbel of six to twenty-five of the large brilliant flowers. The center of the flower is of a rich prune purple bordered with bright lemon yellow, the reflexed divisions of the corolla pure white or tipped with lavender or phlox purple. Several varieties have been introduced as follows.

D. CLEVELANDI *Greene.* As above described, with lavender colored divisions of the corolla. The varieties:

1—Alba. Divisions of a pure white.

2—Splendens. Divisions of a deep brilliant phlox purple.

ECHINOCACTUS.

This genus includes over 200 species of depressed-globose or cylindrical cacti, some of very large size. They are remarkable for their beauty and symmetry of growth, armed with strong spines as a rule.

E. CYLINDRACEUS *Engelm.* Noted for its beautiful flexuous spines, frequently of an ivory whiteness. I have measured one plant that exceeded ten feet in height, and nearly two feet in diameter. Usually under three feet high. Flowers two inches across, of a clear lemon yellow.*

E. EMORYI *Engelm.* Dull red spines and flowers.

E. LECONTEI *Engelm.* Spines of a silvery grey color usually.

E. POLYCEPHALUS *Engelm.* A rare desert species. Very distinct from all others.

E. ORCUTTII *Engelm.* A fine cylindrical form found in Lower California.

E. VIRIDESCENS *Nutt.* A depressed-globose plant, common near San Diego. Known as the Turk's head cactus.

E. WISLIZENI *Engelm.* The Giant Fish-hook cactus; the typical form occurs in New Mexico.

ERYTHEA.

A genus of beautiful palms peculiar to California, related to the genus Brahea, with which it has been sometimes included. The leaves are fan-shaped, without filaments. The fruit is edible, with seeds as large as marbles.

E. ARMATA *Watson.* The Blue palm, with bluish-white leaves for which it ranks high among the ornamental palms.

E. EDULIS *Watson.* A larger tree, of more rapid growth, and foliage of a dark green. Considered one of the most desirable of palms.

ERYTHRAEA.

The Canchalaguas are elegant annuals, a span to a foot high, producing a multitude of bright flowers. The following is the largest and handsomest species in the genus.

E. VENUSTA *Gray*. Flowers an inch across, rotate, with slender tube forming a center of delicate sulphur yellow, the usually five divisions of the corolla of a deep solferino, more rarely lavender or white.* Foliage and stems of light apple green.

ERYTHRONIUM.

The Dog-tooth Violets are distinctively American, with the exception of a single species that is a native of Europe and Asia. The greatest variety of forms thrive in their nativity on the Pacific Coast. They are beautiful lily-like flowers, highly prized in cultivation. They grow in shady places in rock and leaf mold as a rule. The following are the names by which the principal varieties are known in cultivation.

E. CITRINUM. A variety from Oregon.

E. GRANDIFLORUM. The leaves are broad and richly mottled in brown, green and white, with delicate straw-colored flowers, recurved like a lily.

E. GRANDIFLORUM ALBIFLORUM. This sends up from long, narrow corms, broad leaves, conspicuously blotched with purple, and tall, slender racemes of two to six nodding, lily-like, long-pedicelled flowers, which, when fully expanded, are nearly three inches across. The segments are pale yellow, dashed with orange towards the base, with darker orange spots on the interior face.

E. GIGANTEUM. Flowers pure white. Considerable confusion exists in the nomenclature of these plants, which only careful comparisons can straighten. This, E. albiflorum and E. Smithii, are all mere varieties of E. grandiflorum doubtless, and probably indistinguishable from the above variety.

E. HENDERSONI. Described as the handsomest species of the genus, with bright and strongly colored flowers which are very striking and attractive in their beauty. The petals have a very dark purple and somewhat blotched center, which is surrounded by a band of yellow, and beyond this they are pale purple.

E. HOWELLII. Light cream-colored flowers slightly tinged with red, with a yellow center. Discovered in Oregon by Mr. Thomas Howell, for whom it is named. An interesting species that has been found to thrive in New England in a loamy soil in open sunlight.

E. SMITHII. Flowers described as pure white on opening, often changing to purple.

ESCHSCHOLTZIA.

The Golden Eschscholtzia has aided in no small degree in making California famous as a land of sunny flowers, and has very fitly been selected as the state flower of California. In its wild state it often covers thousands of acres of hill or plain with its intensely brilliant and richly colored flowers, which in the bright sunlight are perfectly dazzling. Some botanists recognize more than a dozen species in this genus. The leading varieties in cultivation are known under the following names.

E. CALIFORNICA *Cham.* Flowers large, varying from deep orange to sulphur yellow or even white. The horticultural varieties are:—

1.—Alba. Pure white.

2.—Alba flore pleno. Double white. Very choice and beautiful.

3.—Aurantiaca.

4.—Compacta.

5.—Crocea. Bright yellow.

6.—Crocea flore pleno. Double yellow, new.

7.—Crocea striata.

8.—Dentata aurantiaca.

9.—Dentata sulphurea.

10.—Mandarin. Described as a new and very beautiful variety, of a rich orange or crimson backed with brilliant mandarin scarlet.

11.—Rosea. Very delicate rose color.

12.—Rosea flore pleno.

13.—Rose Cardinal Bright rose to deep carmine, very pretty and remaining in bloom a long time.

14.—Tenuifolia.

EUCALYPTUS.

The Australian Gum trees are so thoroughly at home in California, and so extensively grown, as to almost be considered characteristic of the state. The more popular species are the following.

E. AMYGDALINA. The Giant Gum.

E. CORYNOCALYX *Mueller.* The Sugar Gum.

E. GLOBULUS *La Billardiere.* The Blue Gum, which is more extensively planted than all the others together.

E. LEUCOXYLON *Mueller.* The Iron-bark tree.

E. ROSTRATA *Schl.* The Red Gum, now coming into general favor.

FOUQUIERA.

F. SPLENDENS *Engelm.* The Candlewood, or *Hocotillo* of the Mexicans, is a curious, cactus-like plant, five to ten feet high, bearing terminal spikes or racemes of flaming scarlet flowers. It is characteristic of the desert regions, where it blossoms out whenever a shower occurs.

FRASERA.

F. PARRYI *Torrey.* A curious biennial, with a rotate 4-parted white corolla, dotted minutely with prune purple, and with an apple green spot on each division * Flowers nearly an inch across, in a panicle borne on a stout stem one to four feet high.

FRAXINUS.

F. DIPETALA *H. & A.* Flowering Ash, a small shrub found in Lower California, producing in springtime a profusion of lovely white or flesh-colored flowers. A very ornamental shrub.

FREMONTIA.

A beautiful hardy deciduous shrub or small tree, named in honor of the late Gen. Fremont; bearing conspicuous bright yellow flowers, one to three inches across. But a single species in the genus.

F. CALIFORNICA *Torr.* Of graceful and symmetrical growth and greatly prized for its beauty. Thrives in a sandy loam.

FRITILLARIA.

The Fritillarias are all elegant in habit and among the most beautiful of the many members of the lily family. They have broad base leaves and strong leafy stems, bearing from a few to many flowers, like a spray of bells. The Crown Imperial and many other ornamental plants belong to the genus. The bulbs are light and easily sent by mail, and almost rival their flowers in beauty.

F. ATROPURPUREA *Nutt.* A foot high, growing in dry mountain soils, with dark purple, bell-shaped pendant flowers.

F. BIFLORA *Lindl.* The Chocolate Lily, as it is called by many of its younger admirers, is one of the finest species in a large genus of stately and handsome flowers. The strong leafy stem from a few inches to a foot tall, bearing from one to five large and beautiful deep claret brown campanulate flowers,* in a graceful cluster. Flower an inch long, slightly mottled with green.

F. LANCEOLATA *Pursh* A tall stately plant with curiously mottled greenish-yellow flowers.

F. LILIACEA *Lindl.* A beautiful low-growing plant with white flowers.

F. PUDICA *Sprengel.* Of low dwarf habit, four to five inches tall, with yellow flowers. Early spring.

F. RECURVA *Benth.* A graceful plant, from eight inches to two feet in height, with crimson or scarlet flowers, brilliant and of long duration, useful for cutting. One of the most attractive of Pacific Coast plants, blooms early in cultivation and is readily grown in a light, loamy soil.

GILIA.

Handsome, low growing, profuse blooming annuals, well known to every cultivator of flowers. The genus is peculiar to West America with a few exceptions. A few species perennial but not yet known in cultivation. The numerous varieties in cultivation mostly originated in California, of which the following are best known.

G. ACHILLEAEFOLIA *Benth.* Light blue clusters of flowers.

G. ACHILLEAEFOLIA ALBA. White variety.

G. BICOLOR.

G. CAPITATA *Dougl.* Delicate blue, in dense clusters.

G. CAPITATA ALBA. White variety.

G. CAPITATA MAJOR.

GILIA DIANTHOIDES.

G. DIANTHOIDES *Endl* One of the most charming of Californian annuals, producing a profusion of brilliant rose-pink flowers which completely smother the little plant with loveliness. Flowers large, with a light yellow center. Plant seldom exceeds three inches in height, but forms a broad mat. A perfect gem

G. DIANTHOIDES ALBA A choice white variety of surpassing beauty.

G. LACINIATA.

G. LINIFLORA *Benth.* A finely branching plant, a foot or two high, with large white or pale blue flowers.

G. MINIMA CAERULEA. A dwarf form with lovely blue flowers

G. NIVALIS.

G. TRICOLOR *Benth.* Familiar in cultivation, with several horticultural varieties as follows:

1—Alba.
2—Rosea—splendens.
3—Rubro—violacea.

GODETIA.

G. QUADRIVULNERA *Spach.* A slender annual, with either white or bright phlox-purple flowers, quite showy, a foot or two high.

GREVILLEA.

G. ROBUSTA *Cunningham.* A beautiful tree for the lawn or street, indigenous to eastern Australia, but now extensively planted in California for its beauty. Of rapid growth and resisting drought in a remarkable degree. Grows to a height of 150 feet.

HESPEROCALLIS.

The Day Lily of the Desert is one of the most beautiful and characteristic plants of the desert regions of California. The

large edible bulb produces one or more flower stems which rise from one to two feet above the sand in which they grow, bearing from a few to thirty white fragrant flowers. A single species, H. undulata.

HETEROMELES.

H. ARBUTIFOLIA *Roemer.* The California Holly, or Christmas berry, is a handsome dark evergreen shrub, with white flowers and producing clusters of bright scarlet berries, which ripen at Christmas time.

JUNIPERUS.

J. CALIFORNICA *Carr.* Californian Juniper. A small shrub of ornamental value, common in Southern California.

J. OCCIDENTALIS *Hook.* These two are very similar in aspect.

LASTHENIA.

L. GLABRATA *Lindl.* A composite plant, a span to a foot high, producing a multitude of showy yellow flowers. Annual.

LATHYRUS.

L. SPLENDENS *Kellogg.* 'The Pride of California.' A splendid hardy perennial, producing a profusion of its large, brilliant rose red to crimson blossoms,* in clusters of ten or more. The most magnificent of the native climbing plants of West America.

L. VENOSUS *Muhl.* The flowers of this perennial pea are but a little smaller or less beautiful than the last, of a deep magenta. It has often been mistaken for L. splendens, but if once seen together they can always be recognized.

L. VESTITUS *Nutt.* Lovely white flowers, veined with rose.

LAYIA.

This genus was named in honor of Thomas Lay, the naturalist in Beechey's voyage. They are hardy annuals, thriving in any ordinary soil.

L. ELEGANS *T. & G.* The California Layia is a beautiful upright bushy plant, about a foot high, and producing in abundance brilliant lemon yellow* single flowers, two inches across, the tips of the rays forming often a scolloped white border. Showy.

LEPTOSYNE.

L. DOUGLASII *DC.* Easily mistaken for Layia elegans by those who are not botanists. Equally pretty but more modest and retiring.

L. MARITIMA *Gray.* A striking and showy plant, perennial, the succulent stems a foot or two high, producing large yellow flowers of great beauty, in abundance. Common on ocean beaches.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

SAN FRANCISCO MICROSCOPICAL SOCIETY.

DECEMBER 17TH, 1890.

The regular meeting was held at its rooms, 130 Sutter street, with President Wickson in the chair. Besides a good attendance of members, a number of visitors was present.

After the usual routine business had been transacted, the President announced that the lecture of the evening would be by C. H. Eigenmann, Ph. D., on "The Embryology of Viviparous Fishes."

The speaker began by informing his hearers that the waters of the California Coast abounded in viviparous fishes, the perch and the rock cod being well-known representatives of that class. His investigations had been confined to fishes near the shore, where the depth did not exceed one hundred fathoms; but the deep-sea species examined by the naturalists of the Albatross showed the same preponderance of the viviparous class.

The specimens of fishes shown last night were the common "shiner" of our bay, the Micrometrus aggregatus of scientists. Every stage of development was shown, either by careful prepared and stained sections of the embryo, or by dissections of the matured forms. The eggs of Micrometrus are the smallest fish ova yet described, measuring only a little over one one-hundred-and-fortieth of an inch, or less than those of most mamalia. The average pelegic fish egg has a diameter of one milimeter, or one-thirty-second of an inch, only a very minute portion of which segments and takes part in the formation of the embryo. The egg is deposited by the mother in the water, where it lies or swims unprotected. As the tail of the young fish is formed it begins to move, first feebly and then vigorously, until the membrane surrounding the egg is burst and the young fish swims out.

The development of Micrometrus differs from the usual mode in some very essential particulars, as this form belongs to a family of viivparous fishes almost exclusively confined to the west coast of North America. All the members of this family give birth to their young in an advanced stage. At the time the eggs are ripe the ovary is no thicker than a goose-quill, and the oviferous tissues are folded upon themselves. With the growth of the embryos the walls of the ovary become greatly distended, the oviferous sheets unfolding at the same time. In Micrometrus the active period begins when the eggs are ripe, and culminates at the time the young are set free. In other words, the eggs become ripe when in ordinary fishes they only begin their most active growth.

Dr. Eigenmann illustrated his lecture with drawings at the black-board, and also by very carefully made drawings in India ink. The latter were made with the camera lucida, and consequently were all drawn to scale. The speaker's remarks were received with marked satisfaction by those present, and he

received a vote of thanks. His investigation in the life-history and generic peculiarities of Pacific Coast fishes has been the means of adding many new facts to science.

JANUARY 21ST, 1891.

The regular fortnightly meeting was held at its rooms with President Wickson in the Chair. There were present in addition to a fair attendance of members, Professor Davidson, an honary member, and Charles W. Smiley, of Washington, D.C., editor of *The American Monthly Microscopical Journal.*

After the reading of the minutes and the usual routine business a general discussion was had on the motion to amend the constitution of the society, reducing the initiation fee from $20 to $5. The sentiment was pretty evenly divided, for and against the motion, but by a bare majority further consideration was postponed for one month.

Some interesting and valuable additions to the society's cabinet were received. Through Henry G. Hanks, John A. Edman, of Meadow Valley, Plumas county, Cal., presented two slides of amalgam crystals, which were both interesting and beautiful. They are original gold crystals, before being carefully treated with cold, strong nitric acid, and have a good deal of free mercury adhering which can only be abstracted by contact with bright gold or silver In this case, the donor writes, the amalgam crystals are likely to adhere to the metal so as to break when dislodged. At a temperature a little over 70° Fahr. the crystals begin to deliquesce, and become fluid at about 100°.

Colonel C. Mason Kinne donated to the cabinet a small quantity of fresh-water diatomaceous earth he had received from Dr. Arthur M. Edwards, Newark, N. J. Accompanying the specimens there was a note from Dr. Edwards, stating that the deposit was discovered recently at Waverly, N. J. It is interesting as being the first discovered which places the diatoms below the recent and on the glacial deposit. This bed was found last June and is fully eight feet below a deposit of marine diatoms. The discoverer calls it an intra-glacial deposit. The President gave a portion to Mr. Riedy, with the request that he work it up and report at an early meeting of the society.

WILLIAM E. LOY, Rec. Sec.

EDITORIAL.

A timely article is presented to our readers this month by Prof. F. L. Washburn on laboratory work in school and college, which educators will do well to read.

The orange, the cultivation of which is one of the most important industries in southern California, is a subject which we believe all our readers, east or west, will enjoy learning about. One method of propagating this tree is omitted in the article presented this month, that of growing from the *leaves!* The propa-

gation of trees and plants from leaves alone is an interesting subject on which we invite correspondence.

It is the aim of this magazine to present something of interest each month to as many classes of readers as possible. We number among our patrons geologists, botanists, zoologists, and those interested in floriculture and practical horticulture, but we are obliged to omit or but slightly touch upon subjects of great importance, to some of our readers at least, through lack of space. Thirty-two pages will not begin to hold all that we would—but there is always room for the *best.*

NOTES AND NEWS.

G. W. Wright, Karanaghope Rd., Auckland, New Zealand, desires to exchange New Zealand for American shells, and invites correspondence.

Miss Ida M. Shepard, of Long Beach, California, has been making extensive collections of San Diego shells this winter, and intends collecting on the coast of Lower California.

A specimen of diatomaceous earth from the ocean beach near San Diego found by C. R. Orcutt some years ago, has been examined by Clarence Lown. It was very like some samples of the Redondo Beach deposit, and may have been washed from there. The sample contained some of the rarer species of diatoms, and was particularly rich in Aulisci.

The asbestos mines of Skagit county, Oregon, produce a superior quality of asbestos, and the output is rapidly increasing. Large quantities are being shipped to Portland and Tacoma.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the Library of the West American Museum of Nature and Art will be catalogued monthly.

4063. Catalogue of the land and freshwater mollusca of the British Isles, with all the named varieties. By T. D. A. Cockerell. From the author.

4064. U. S. Board on Geographic names. Bulletin No. 1, issued Dec. 31, 1890. Published by the Smithsonian Institution.

4065. Bull. of the Museum of Comparative Zoology, XX, No. 4. Cristatella: the origin and development of the individual in the colony. By C. B. Davenport. With eleven plates. November, 1890.

4066. The American Garden: an illustrated journal of horticulture. Edited by L. H. Bailey. Vol. XI, 1890. New York. The Rural Publishing Co. 780 pp., Royal 8vo,

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THE

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15,423

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THE QUICKSILVER MINES OF OREGON.

The quicksilver mines that have been worked in Oregon, are situated in the northeastern part of Douglass county, on the head waters of the Umpqua river.

There are three that have been worked, the Nonpareil, Bonanza, and Elk Head. The former is situated on Calapooia creek, eight miles northeast of Oakland. The main lead, or deposit, is at the juncture of the sandstone on the west and basalt on the east, which is of a hard quality, and in some places partakes of the columnar structure so common in other parts of the state. There are, however, a few places where sedimentary rocks are on both sides of the lead, yet they seem to be only in spots, forming, perhaps, only cap rocks of no great depth. The veins of ore are much distorted, running a little east of north and west of south, of uneven widths, composed of volcanic tufous rock intersected by veins or ribs of jaspery iron ore formed by infiltration through crevices of water containing iron protoxide and silicic acid. The dip of the ledge is from west to east, though it is difficult to follow on account of its sinuosity and its swelling and pinching.

The walls are both volcanic rock. The sandstone on the west not reaching quite to the vein proper, neither does the hard basalt, as a rule, reach the vein on the east, there being a softer tufous rock, of varying character and hardness, composing the walls, gradually emerging into the other rock as they recede farther from the vein, which is from a few inches to many feet in thickness. The cinnabar being in spots, specks and streaks throughout the entire vein, which is richer in some places than others.

A small body of limestone has been found within a few yards of the vein in the sandstone. There is in a few places what appears to be a cap rock of sandstone and conglomerate overlying the basalt to the eastward near this mine, as also the Bonanza. This, however, is not without doubt as to its extent in depth. The trap appears to have pushed the sedimentary rocks out of their original position.

The Bonanza mines are situated some three miles southwest of the Nonpareil. The walls of the Bonanza are the footwalls of the sandstone on the west, but on the east it is usually slate. However, this slate is most likely only a cap on the basalt, which evidently underlies the slate at no great depth. The mountain being several hundred feet high, it has been worked mostly by tunnels instead of shafts. There are many small veins of very rich ore running in various directions through the main vein or lode, which is in places two or three hundred feet wide. Many fine specimens of the sulphides of mercury have been taken from this mine. It contains the mettacinnabarite, found only in this mine and the St. John's mine in California, which ore is more of a mechanical mixture than a chemical compound; but is, however, more or less mixed with the red sulphuret, as its streak is often quite red.

This mine also contains a considerable amount of native mercury, usually in fine particles disseminated throughout the various rocks.

The Elk Head mines are situated thirteen miles north from Bonanza, and differ from the others in having the trap, which in this case is amygdaloid, usually containing natrolite crystals and other zeolites on the west, and the sandstone in large areas on the east. The dip is slightly to the east or southeast. A few fine specimens have been taken from this mine, but the ore, though a splendid working ore from its large vein of soft tufa being easily worked, is not noted for fine specimens.

Somewhat to the south of this mine, cinnabar has been found directly in the trap rock without any apparent vein, but no large amount. All three of these mines agree in having large mountains of volcanic tufa or ocherous rock on the north, all of which usually contains a little cinnabar.

A small deposit of cinnabar ore in the southwestern part of Douglass county on the divide between the southern head waters of the Looking Glass creek, and those of Cow creek, eight miles west of Riddle, differs from the foregoing in having a large deposit of serpentine on the east, taking the place of the traps in the other mines.

Deposits of granite in the serpentine are a leading feature of this locality. All the foregoing agree in having the contiguous sandstones much metamorphosed.

The former three are in formations supposed to be not older than Eocene, probably lower Eocene, but the latter is thought to be much older, and not later than lower cretaceous, as some fine fern leaf impressions in the adjacent shale have been on good authority, pronounced carboniferous. I have now a number of these specimens among my collections.

Small deposits of cinnabar have been found in Baker and Josephine counties, but I am not aware of any other deposits of note.

Aurelius Todd.

IMMIGRANT PLANTS IN LOS ANGELES COUNTY, CALIFORNIA.

To the European visiting California it is cheering to find that though 6000 miles from home some of the flowers so familiar to him in the old country still greet him here. Under such varied conditions of soil and climate, these Old World immigrants have considerably changed; some, like the genus homo, have been improved racially and individually, while others, under the same conditions, have shown little increase, or have even depreciated.

Certain immigrant plants are so identified with the invasion of the Anglo Saxon race that their presence may be considered a proof of commencing colonization. 'Twas the constant association of Plantago major, the broad-leaved plantain, with the homes of the

early pioneer, that led the Indian to call it the "white man's foot." A farther traveled and more constant companion of civilization is the Shepherd's Purse (Capsella Bursapastoris), already abundant in California.

This hardy and prolific weed accompanied the Roman legions in their conquest of Gaul and Britain; and, after the lapse of centuries, followed the Anglo Saxon in the peaceful conquest of the West. The more useful European species have, of course, been primarily introduced for agricultural or domestic purposes. Of these the most valuable and most interesting historically is the Medicago sativa Lin., the alfalfa of the Spaniard, and Lucern of the French. This has been so long and so commonly cultivated in Spain that it seems but natural they should have introduced it here in the early days of the conquest. Though cultivated before this time by the Greeks and Romans, it is not indigenous to Italy, having been brought from Media at the time of the Persian war, 470 years before the Christian era. The very name (Alfalfa) indicates its origin, being the Arabic derivation of the Persian name. The history of Alfalfa is but the history of many of our now supposed indigneous plants; they have by accident, or otherwise, followed the path of civilization westward, till it becomes difficult to discriminate between what is indigenous, or otherwise.

Among the other useful fodder plants, abundant around Los Angeles, are: Erodium cicutarium and Erodium moschatum, or Filaree, better known in Europe as the Stork's bill and Melilotus parviflora, the Melilot. Whether these, like Alfalfa, were intentionally introduced, I have no means of knowing, but the probability is their introduction was accidental, and once introduced, and their value recognized, their wide-spread distribution is easily accounted for. Around Los Angeles, it seems to me its introduction, useful though it is, is not altogether an unmitigated blessing, as it has crowded out the natural and more enduring native grasses that otherwise would afford grazing supplies long after the filaree has disappeared.

Of grasses, I have observed Lolium perenne (rye grass), Dactylis glomerata (cock's-foot), Phleum pratense (cat's-tail), Festuca myurus, Phlaris canariensis and Poa annua, in the lawns and waste places within the city. Eragrostis pœoides and Panicum crusgalli are not infrequently near the river. Lolium temulentum exists sparingly at San Pedro; Bromus racemosus general, and in many parts common, and seems the only important grass that tends to naturalize and increase.

Of the clovers, Medicago deticulata, the Burr clover alone is common, the nature of its fruit ensuring its maintenance and continued extension; Medicago lupulina and Trifolium arvese, or Dutch clover, are merely casuals, and rare at that.

First cultivated, as useful plants, Brassica nigra (wild mustard),

B. campestris, Mentha piperita or peppermint, Marrubium vulgare, (Hoarhound) and Nasturtium officinale, (common watercress), have passed control and become firmly naturalized. The peppermint and watercress, from the lack of water or marshy ground, are not very abundant, but the others have multiplied to such an extent as to become the commonest and most injurious of weeds, covering acres of ground, to the entire exclusion of more useful species.

Malva borealis, the common mallow of the district, like Brassica nigra, grows so rank here as to be scarce recognizable as the European species, and springs up annually in most cultivated localities.

Around town, in some of the drier, localities, the field Convolvulus (Convolvulus arvensis), has secured a foothold. Its creeping habits and extensive rootlets make it one the most noxious and ineradicable of weeds, and should it secure itself in the cultivated districts the farmer's life will be no sinecure.

The Caryophyllaceæ order has three representatives:

Silene gallica, not uncommon in waste ground.

Stellaria meadia, around yards, and Cerastium triviale, found occasionally in the lawns.

Anthemis cotula, the May weed, is not uncommon on railway banks. Silybum Marianum, the milk thistle, grows along the San Gabriel. Centaurea meletensis, Sonchus oleracea and Sonchus asper are common in the city, the latter, contrary to the usual experience, is as common here as S. oleracea.

The common dandelion (Taraxacum officinale) may be observed in the lawns among imported grasses, but it does not take kindly to the dry soils.

A few specimens of Vicia sativa, the tare of cultivation, Dipsacus fullonum, the fuller's teazel, are annually found as escapes from cultivation.

Around the gardens and roadsides Polygonum aviculare and Chenopodium album are very common. The Plantago major may be found in moist ground, near zanjas, while its lesser brother, the P. lanceolata, or rib-grass, struggles for a casual existence in the grounds in the city.

Last of all, comes the Urtica urens, the lesser nettle, clinging, according to its Old World custom, around the haunts of man.

These, so far as I have observed, comprise all the European immigrants present in and around Los Angeles, but as time rolls on, we shall, no doubt, see the importation of many others.

A. Davidson.

LEUCOCRINUM MONTANUM.

The generic name of this dainty little plant means white lily; translating the entire scientific name it might be called, White Lily of the Mountains. It seems more appropriate, however, to name it White Prairie Lily; for it is the most attractive of the spring flowers of the eastern Colorado plains.

In the vicinity of Denver the plants are quite common during May, and in some localities can be seen for miles; great clumps of snowy flowers nestling in a bed of grass-like leaves. It is not unusual to find many plants in one cluster from which fifty blossoms could be easily gathered.

These six rayed starry lilies spring from ground the surface of which is often as hard as a rock and unfold to the blue sky, breathing forth their adoration in a delicate, exquisite perfume.

They seem to be as hardy and brave as beautiful; for a temperature away below zero does not freeze them, nor do the hot, dry days of summer deprive them of life.

It will be wondered, perhaps, how it is possible for this fragile looking flower to live and bloom in such adverse surroundings. The secret lies buried deep in the ground at its roots. During the spring rains and snows, the warmth and moisture awaken this sleeper from its ten months' repose and soon it shoots up, immediately beginning to form roots for the next year. On one plant can be found three sets of roots. The lowest are ghosts of roots that gave up their life to feed the growth of the previous spring; next are numerous long fleshy roots that are rapidly being exhausted; and uppermost the tender white roots are just beginning to collect the supply for the next year.

Most lilies store their nourishment in bulbs, but this independent prairie flower, has instead a short erect root stock and many long, fleshy roots.

The tube of the perianth extends down among the leaves and bracts for about two inches and its divisions are nearly an inch long, making the expanded flower about two inches in diameter. The seed vessel is at the very bottom of the tube and underground. I know of no other plant that naturally ripens its seeds underground, and have been greatly puzzled to explain this peculiar habit, which would seem to effectually check its distribution.

The only reasonable hypothesis that has occurred to me is this: the plant requires to be some depth below the surface so as to obtain sufficient moisture; it is found where the signs of gophers and prairie dogs abound; so, probably, the underground portions serve as food for these little animals and the seeds are thus properly distributed.

Alice Eastwood.

THE FOREST TREES OF OREGON.—III.

The timber of the following forest trees is specially adapted for cabinet work:

THE OREGON BROAD-LEAVED MAPLE (Acer Macrophyllum).—The wood of this tree is dense and handsome, polishing well, with a rich variety of grain. For household furniture it is a valuable material. As a shade tree it is superior. It grows rapidly, transplants easily, and if left to itself forms a handsome head.

ACER CIRCINATUM (the Vine Maple).—As its name indicates, it is too small for anything larger than barrel hoops, for which purpose it is sometimes sent to San Francisco.

OREGON ASH (Fraxinus Oregona).—This ash is abundant along the streams of western Oregon, sufficiently so to give it a place as a wood of commerce. Specimens of it may be seen in our cabinet shops that will vindicate this claim. The U. S. custom house at Portland is finished inside with Oregon ash. It loves moist places, and is on this account not suitable for shade or ornament.

OREGON ALDER (Alnus Oregona).—The Oregon alder is abundant along stream beds and other damp places. So marked is its love for springs and streams that the presence of a clump of these alders will often reveal to the thirsty explorer a spring of water. Its trunk is often two feet through. Its wood is often used in our cabinet shops, where it is prized for inside work such as drawers.

OREGON MYRTLE or California Laurel (Oreodaphne Californica). This handsome, fragrant tree is abundant along the Umpqua river and through Rogue river valley. It is at its best around Coos bay, where it is shipped to San Francisco. As it is so heavy that it will not float in water it is difficult to bring this wood to market. It is durable and susceptible of a fine polish, and in every respect is a wood to be prized in commerce. As an ornamental tree it is highly valued, but is difficult to transplant. Its fruit is fairly abundant and the tree may be raised from the seed.

THE OREGON LAUREL or Madrona (Arbutus Menziesii).—The madrona is frequent in Jackson county and occasional in the Willamette valley. For purposes of commerce it is not abundant enough. It is a handsome, dense, close-grained wood that bears a good polish and is durable. As an addition to the lawn or dooryard it is a real ornament, resembling the European laurel.

THE DOGWOOD (Cornus Nuttallii).—This tree is ordinarily too small and is too seldom met to be of any importance to commerce. But its wood is a very handsome one for furniture or parts of furniture requiring narrow boards. It often grows to be twelve or fifteen inches through and is capable of a high polish. In all respects it is a fine wood for the turning lathe.

THE COTTONWOOD (Populus trichocarpa or Balsamifera).—This tree is very abundant along the rivers and smaller streams and often

reaches a large size. Recent experiments in making paper from the fibers of this wood have been so successful that there is but little doubt of its future importance. This wood is soft and its fibers so silky as to insure the best results for paper making.

WILD CHERRY (Prunus emarginata, variety mollis). In the Willamette valley this tree is often in small groves of slender, straight form, eight to ten inches through; more seldom one finds a single tree twelve to eighteen inches through. Its wood is a handsome smooth material for furniture. In the coast mountains it is often seen in groves of considerable extent of long, straight and slender poles. *Thomas Condon.*

PACIFIC COAST WOMAN'S PRESS ASSOCIATION.

This Association formally announced its organization to the public by holding its first semi-annual meeting in San Francisco, on the 16th, 17th and 18th of March. It was organized in September last, and has a membership of about two hundred.

The officers were wisely chosen, and are: President, Mrs. Nellie B. Eyster; first vice-president, Mrs. Jeanne C. Carr; second vice-president, Mrs. Kate Douglas Wiggin; third vice-president, Mrs. Sarah B. Cooper; corresponding secretary, Mrs. E. T. Y. Parkhurst; recording secretary, Mrs. Sam Davis; assistant recording secretary, Mrs. Emily Brown Powell; treasurer, Mrs. Mary O. Stanton; auditor, Mrs. Isabel Raymond; librarian, Mrs. S. E. Reamer.

Only those having cards of admission were allowed to enter the hall where the exercises were held, but of these there were enough to fill the room at each session of the Association. The program was sufficiently varied to give interest to each session, while some of the papers were able and of unusual merit.

Among the notable women participating in its exercises—one of whom has a world-wide fame, and others of more than local honor—were, Mrs. Rose Hartwick Thorpe, Mrs. Charlotte Perkins Stetson—a most worthy descendant of Lyman Beecher and niece of Edward Everett Hale, Mrs. Sarah B. Cooper, Mrs. Wiggin, Mrs. Eyster, the president, Mrs. Parkhurst, the founder of the Association, and others. Madame Modjeska is an honorary member of the Association.

San Diego was represented by three delegates, Mrs. Rose Harwick Thorpe, Mrs. Evelyn M. Ludlum, Mrs. John R. Berry. Mrs. Thorpe's thoughtful poem, "Progress," deserves a careful reading before its beautiful depths are sounded and the poem fully appreciated.

Mrs. Berry read a short paper upon the topic assigned her, "Woman's Work in San Diego."

There were banquets, excursions, and receptions given to the Association by the cordial citizens of the city.

The next, which will be the annual meeting of the Association, will be held during the third week in September, at Hotel Del Coro-

nado, when it will receive from San Diegans as cordial a reception as that accorded to it by dwellers about the Golden Gate.

Mary S. Berry.

CALIFORNIA TREES AND FLOWERS.—III.

LIBOCEDRUS.

L. DECURRENS *Torr.* California White Cedar. A tall tree, conical in shape, in foliage and habit resembling Thuya gigantea.

LILIUM.

There are about fifty species of lilies in the world, California possessing eight handsome species, which are widely sought for their showy and often fragrant flowers. They are better known in European than in American gardens, but are worthy of greater attention in their native land.

L. WASHINGTONIANUM *Kellogg.* The Washington Lily is a tall, stately plant, with whorls of dark green leaves and many pure white fragrant flowers. A beautiful species, growing in loose soil on ridges or lightly shaded hillsides.

L. PARRYI *Watson.* This fine and exceedingly rare lily, named in honor of the late Dr. C. C. Parry, produces lovely clusters of large and very fragrant flowers of a clear lemon yellow.

L. RUBESCENS *Watson.* A rare form resembling the Washington Lily, except in the color of its exceedingly fragrant flowers, which change from white to dark ruby red after opening.

L. PARVUM *Kellogg.* A low, slender, graceful plant, bearing from two to fifty or more bell-shaped flowers with light yellow centers dotted with brown, the petals tipped with scarlet or crimson.

L. MARITIMUM *Kellogg.* The Marine Lily resembles the last, small, with dark green foliage, and usually fewer deep crimson or blood-red flowers, dotted with black.

L. PARDALINUM *Kellogg.* Hardy and very handsome, preferring a rich moist soil; bearing large and brilliant crimson flowers, dotted with black and with a yellow center. A favorite.

L. HUMBOLTII *R. & S.* Large and tall, stout, with orange-red flowers, spotted with brown. Thrives in dry open places. The Humboldt Lily is very stately and handsome.

L. COLUMBIANUM *Hanson.* A graceful miniature of the last.

LOBELIA.

L. SPLENDENS *Willd.* Two or three feet high, growing in moist situations, producing a many-flowered raceme of intense red blossoms.

LOESELIA.

L. TENUIFOLIA *Gray.* A showy plant, a span to a foot high, producing abundantly brilliant poppy-red or carmine flowers. Perennial.

L. EFFUSA *Gray.* An equally beautiful species of the mountains of Lower California, low in habit with light rose purple flowers. Like Phlox and Gilia, Loeselia is a genus of lovely flowers, well worthy of cultivation.

LUPINUS.

Showy annuals or perennials, a few shrubby, bearing conspicuous flowers in terminal racemes. The great majority are indigenous to West America. Many have long been cultivated and grown popular. The California species best known in cultivation are the following:

L. AFFINIS *Agard.* A foot or two high, often growing very rank, producing large spikes of brilliant blue flowers.

L. DENSIFLORUS *Benth.* Less than a foot high, with white flowers arranged in umbel like clusters on the terminal spike. Sometimes light sulphur yellow.

L. MICRANTHUS *Dougl.* Low in habit, with racemes of small light blue and white flowers. The cultivated form is considered quite pretty.

L. NANUS *Dougl.* A slender plant, with bluish, purple or white flowers.

L. NANUS ALBUS. The white flowered form.

L. ARBOREUS *Sims.* The Tree Lupin is a shrub four to ten feet high, with lilac colored flowers.

L. ARBOREUS LUTEUS. With sulphur yellow flowers, perhaps the typical form. A very ornamental shrub.

L. ELEGANS. What its name signifies.

L. GRANDIFLORUS. A perennial form, with blue, white or purple flowers.

L. POLYPHYLLUS *Lindl.* Perennial, similar to L. grandiflorus if the two are not identical or forms of the same species.

L. POLYPHYLLUS ALBIFLORUS. The white variety.

MAMILLARIA.

Very general favorites among the lovers of the odd or the beautiful are these unique little plants, most exquisite in form and finish. The scarlet edible berries, which cluster among the spines of our California cacti of this genus add also to the beauty of these plants, though the blossoms are often inconspicuous.

M. DESERTI *Engelm.* A little gem, from the Mojave Desert, of which we have as yet seen but a single plant. One of the choicest of the genus and we hope to rediscover the beauty soon.

M. GOODRIDGII *Scheer.* Sometimes called the Strawberry cactus, from the delicious flavor of its clubshaped fruit, but also called the Fish-hook cactus from the hooked central spines produced from the mamillae. The spines are sometimes of an ivory whiteness, but oftener of a rich brown color.

M. PHELLOSPERMA *Engelm.* A handsome plant, worthy of a place in any lady's parlor.

MIMULUS.

M. CARDINALIS *Dougl.* A showy perennial species, with brilliant large scarlet flowers.

M. GLUTINOSUS *Wendl.* A low shrub, with bright evergreen foliage and a profusion of buff or salmon colored showy flowers.

M. MOSCHATUS *Dougl.* Musk. A low, musk-scented plant, bearing large lemon yellow flowers.

MONARDELLA.

A genus of many beautiful flowers, well worth extended cultivation, showy, often sweet scented, either perennial or annual.

M. MACRANTHA *Gray.* An evergreen species with dark glossy foliage, a span high, producing showy heads of orange-red flowers.

M. NANA *Gray.* Almost identical in habit and general aspect with the last, the flowers pure white, sometimes suffused with rose. Very beautiful but less showy than the last.

M. LANCEOLATA *Gray.* A showy annual, producing masses of bright phlox purple flowers, six to eight inches or a foot high, branching, with a strong but pleasant pennyroyal perfume, similar in aspect with numerous related forms, like M. Pringlei and many others, all of which are well worthy of a place in any garden.

NEMOPHILA.

Very pretty annuals, mostly Californian, with tender herbage and lovely flowers of delicate blue, violet or white colors.

N. AURITA *Lindl.* Large violet flowers, one of the finest species introduced into cultivation.

N. AURITA ALBA *Dougl.* A beautiful white form.

N. INSIGNIS *Dougl.* Bright blue flowers an inch in diameter.

N. MACULATA *Benth.* White, with a strong violet blotch at the top of each lobe of the corolla. 'Love Grove.'

NICOTIANA.

N. GLAUCA *Graham.* A slender shrub, a native of South America, very light green foliage and yellow flowers, considered very striking and ornamental among the sub-tropical foliage plants. Naturalized in Southern California.

NOLINA.

Perennial liliaceous plants, with a thick woody trunk, in aspect somewhat resembling the Yucca. The stout flowering stem bears a panicle of numerous small creamy white flowers.

N. BIGELOVII *Watson.* The flowering stem six to ten feet high, bearing a dense panicle. The plant sometimes grows ten or more feet high.

N. PALMERI *Watson.* A cluster of these plants will cover a considerable area, and with the coarse, grass-like foliage may well be mistaken for a patch of some coarse species of grass at a distance. Less ornamental than the preceding.

ŒNOTHERA.

An almost exclusively American genus of over one hundred species, many with showy flowers, and some long in cultivation as ornamental.

Œ. BIENNIS *L.* The Evening primrose, with its large showy flowers, is too well known to need description.

Œ. BISTORTA *Nutt.* Showy yellow flowers, usually with a dark brown spot at base of each petal. A low decumbent annual, the variety Veitchiana being the form commonly seen in cultivation.

Œ. CALIFORNICA *Watson.* Low flowers, large white, becoming pinkish, fragrant. One of the loveliest and most delicate of flowers, often two or three inches across.

ORTHOCARPUS.

A large genus of low, branching annuals, nearly related to Castilleia.

O. PURPURASCEUS *Benth.* An erect, diffusely branched annual, a span to a foot high, producing numerous dense and thick terminal oblong or cylindrical spikes of flowers. Corolla yellowish, tipped with crimson or red and the whole encircled by the brilliantly colored crimson-purple or rose-purple floral bracts. Hundreds of acres are often transformed into brilliant fields of purple by the abundance of this, one of the handsomest of the spring annuals of California.

PAPAVER.

P. CALIFORNICA. *Gray.* While one of the latest discoveries, this plant ranks among the prettiest of our annuals, the fine bushy plant, a foot or more high, bearing large showy flowers of an average of two inches in diameter. The color is a bright saturn red to orange chrome, with a center of delicate sulphur yellow.

PENTACHAETA.

P. AUREA *Nutt.* This small hardy annual, with its large golden yellow heads of almost double flowers, introduced into cultivation in 1884, is a pretty dwarf composite that may be readily grown.

PENTSTEMON.

Hardy perennial plants with showy panicles of brilliantly colored flowers. Several of the numerous California species have long been in cultivation.

P. CENTRANTHIFOLIUS *Benth.* A showy species, two or three feet high, bearing long slender spikes of bright carmine-colored flowers, an inch long. Acres in extent of our mountain lands are sometimes a solid mass of carmine during the summer, when this handsome plant is in bloom. It was introduced in 1858.

P. CLEVELANDI *Gray.* One to three feet high, with dark green foliage and bearing a spike of lovely bright solferino-colored flowers, each an inch long.

P. PALMERI *Gray.* A tall growing species, with a long panicle of large white flowers delicately veined with purple.

P. SPECTABILIS *Thurber.* Corolla an inch long, broad, bluish-purple. Plant two or three feet high, glabrous. Flowers in a loose elongated panicle. A very showy species. This genus contains nearly a hundred species, nearly all worthy of cultivation, and many native to California.

PHACELIA.

P. CAMPANULARIA *Gray.* One of the finest species in the genus yet known in cultivation. Has received a first-class certificate in England, where it was introduced a few years ago.

P. CONGESTA. A useful plant in bee-gardens, like the rest of the genus, and one of the best known species in cultivation.

P. TANACETIFOLIA *Benth.* The Tansy-leaf Phacelia has long been in favor in cultivation for its beautiful foliage. An erect hardy annual, one to three feet high, bearing cymosely clustered spikes of light bluish flowers.

P. TANACETIFOLIA ALBA. A fine cultivated variety, with white flowers.

P. ORCUTTIANA *Gray.* One to three feet high, branching, bearing a profusion of small white flowers with brilliant yellow centers.

P. PARRYI *Torr.* One of the loveliest and most desirable of the many pretty annuals of Southern California for cultivation, second only in value to P. campanularia. The plant delights in warm sunny exposures, and produces large brilliant royal purple flowers with an open rotate corolla. Everyone admires this modest flower, whose bright face looks out at one with something akin to a human expression.

P. WHITLAVIA *Gray.* Large bell-shaped blue flowers.

PICEA.

P. SITCHENSIS *Carr.* Probably the tallest spruce known, growing 150 to 200 feet high, and of pyramidal form. An excellent timber tree.

PLATYSTEMON.

P. CALIFORNICUS *Benth.* A low annual, a span high, with delicate sulphur-yellow flowers, called Cream-cups by the children. Belongs to the Poppy family.

PROSOPIS.

P. JULIFLORA *D C.* The Mesquit tree of the desert regions, sometimes planted for hedges. The bean-like pods of this tree are useful for forage, and form an important article of food among some Indian tribes. Very sweet and nutritious.

P. PUBESCENS *Benth.* The Screw-bean. A smaller tree than the Mesquit, with curiously twisted pods.

PRUNUS.

P. ILICIFOLIA *Walp.* The Holly-leaf cherry. A beautiful dark evergreen shrub, yielding a pleasant edible fruit. Useful for hedges or ornamental planting.

PSEUDOTSUGA.

P. DOUGLASII *Carr.* The magnificent Douglas spruce, better known commercially, perhaps, as the Oregon pine. A gigantic tree, 200 to over 300 feet in height, and very beautiful.

Var. macrocarpa Engelm. A small form.

RHUS.

R. OVATA *Watson.* A handsome evergreen shrub, noted for its glossy foliage and graceful form. The small dark red berries make a cooling drink, pleasantly flavored, resembling lemonade, and the Indians formerly gathered sugar from this species. Thus it may be appropriately termed a Lemonade and Sugar Tree.

R. INTEGRIFOLIA *Nutt.* The dark evergreen foliage of this shrub or small tree, locally known as the Mahogany, is very handsome, while the larger bright red berries, coated with a white waxy substance also make a refreshing and cooling drink. The Californians formerly gathered and dried the berries for this purpose.

ROMNEYA.

This large white-flowering perennial poppy, named in honor of Dr. T. Romney Robinson, a noted astronomer, is one of the stateliest of California's contributions to horticulture. It is quite a hardy shrub with us, requiring only a sheltered position to protect its flowers; in England it is classified as half-hardy. A rich loamy soil is most suitable to its needs. In early spring vigorous shoots start from the dormant roots, growing from six to fifteen feet high, which do not die down but need to be pruned well back in the fall. A single species.

R. COULTERI *Harvey.* This magnificent wax-like flower has become very popular wherever known. The large hairy buds open at daylight, the crimped petals slowly unfolding from over the huge bunch of bright yellow stamens (as large as a walnut), until they spread out from six to nine inches. The flowers last several days and the buds open well in water. The foliage is very effective and makes with the flower an artistic study. Grown from either seed or cuttings with difficulty, but a well established root will well repay the attention bestowed upon it.

ROSA.

R. CALIFORNICA *C. & S.* The wild rose of California, with its

large, single, lovely pink flowers, is as pretty as its more showy cultivated sisters, and equally admired by those who love the beauties of nature.

R. MINUTIFOLA *Engelm.* Parry's wild Mexican rose, with its small, finely incised foliage, and small pink or white flowers that closely nestled among the leaves, met with a warm welcome when discovered in Lower California in 1882, but has steadily repulsed the kind advances of the gardener and refuses to long survive away from its native sky.

SALVIA.

S. CARDUACEA *Benth.* The Thistle-leaved sage, known to the Mexicans as *Chia*, is densely white-woolly, with prickly foliage, and showy lavender colored flowers, an inch long, in many-storied head-like whorls on a stem a foot or two high. Cultivated in Europe since 1854.

S. COLUMBARIÆ *Benth.* Smaller and less conspicuous. Also known as *Chia.* The seeds of either species infused in water form a pleasant mucilaginous drink; used largely by the aborigines medicinally as a beverage.

SAMBUCUS.

S. GLAUCA *Nutt.* The California Elder forms a large bush or small tree and bears prolifically of its edible berries, prized by some for making pies or sauce.

SCHINUS.

S. MOLLE *L.* A graceful evergreen tree, a native of Mexico and South America, with glossy light green drooping leaves in twenty or more pairs of slender leaflets. The small white flowers in large panicles followed by lovely clusters of small red berries. The Pepper tree, as it is called, is very ornamental, and planted extensively for shade or avenues.

SEQUOIA.

A remarkable California genus, including the noted Redwood and Big-tree for which California is famous.

S. GIGANTEA *Deciasne.* This giant of the California woods, is the largest and tallest tree known to exist on the American continent, attaining a height exceeding 300 feet, only exceeded in size by some of the gums of Australia.

S. SEMPERVIRENS *Endl.* The California Redwood is the most valuable timber tree on the Pacific Coast, attaining a height of 200 to 300 feet, with light but strong and durable wood, susceptible to a handsome finish, of a walnut brown color.

SIMMONDSIA.

S. CALIFORNICA *Nuttall.* A low diffusely branched shrub, forming oval bushes one to five (rarely ten or fifteen) feet high with pale,

rigid evergreen foliage, producing a pleasant edible nut. An ornamental shrub, growing in rich valleys or on arid hills from the Pacific Ocean to the borders of the Colorado Desert.

SISYRINCHIUM.

S. BELLUM *Watson.* The Blue-eyed grass bears umbel-like clusters of small rotate flowers of a delicate shade of mauve, with canary yellow centers. A profuse bloomer. Grows from a few inches to two feet high. A very pretty Iris-like plant.

TORREYA.

T. CALIFORNICA *Torr.* The Californian Nutmeg is a tree fifty to seventy-five feet high, with slender drooping branches often grown for ornamental planting.

UMBELLULARIA.

U. CALIFORNICA *Nutt.* The California Laurel is a handsome shrub or tree, ten to seventy feet high, with thick evergreen leaves, better known in cultivation as Oreodaphne Californica.

WASHINGTONIA.

W. FILIFERA *Wendland.* The Californian or Washington fan palm is too well-known to need description. It has become one of the most characteristic trees in Southern California and is a worthy memorial to the fame of the great Washington whose name it bears.

W. ROBUSTA *Wendland.* A robust variety (not specifically distinct?) said to be more easily grown. None of the characters which are said to distinguish these two palms appear to be constant.

YUCCA.

An American genus of a few species of handsome and conspicuous ornamental plants, well known in cultivation.

Y. BACCATA *Torrey.* The Wild Date, or Spanish Bayonet, is a stately plant, sometimes growing ten or more feet high, and producing a pyramidal panicle of fragrant waxy, pure white flowers, or often marked with purple. The large, sweet edible fruit is sometimes called wild bananas.

Y. BREVIFOLIA *Engelm.* The Tree Yucca of the Mojave Desert.

Y. WHIPPLEI *Torrey.* The flowers borne in a large panicle on a scape five to twelve feet high. The rigid serrulate leaves surround the base of the stem in a dense cluster. The flowers are waxy-white or purple tinged. The plant dies after blooming, while the preceding species live year after year.

ZAUSCHNERIA.

Z. CALIFORNICA *Presl.* The flowers of this plant are one to two inches long and three-quarters of an inch across, scarlet to scarlet

vermilion, very showy, forty to fifty flowers on a stem. Plant two to five feet high, growing in large masses on dry hillsides, but more luxuriant near water, where it becomes a very conspicuous flower. A half shrubby perennial, sometimes called wild fuchsia.

ZIZYPHUS.

Z. PARRYI *Torrey.* A spiny shrub, with small flowers, producing an edible fruit of a dull brownish cadmium yellow color, said to make excellent jelly like its near relative, the cultivated jujube.

ZYGADENUS.

Z. FREMONTI *Torrey.* A pretty plant, belonging to the lily family, with paniculate racemes of cream-colored flowers.

C. R. Orcutt.

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JUL 22 1891

THE TUNA.

(From the *Pacific Rural Press*, xli. 189.)

Probably no class of plants is more greatly admired or more thoroughly detested than the Cactaceæ—admired for their oddity, for their beauty of form, for their lovely flowers and for their luscious fruit, the cacti are detested to almost an equal extent by the average cattleman or rancher as a useless cumberer of the ground.

The flattened oval or elliptical stems of the tuna, abundantly armed with a formidable array of spines, is the type of one of the most familiar forms of cactus, and perhaps better known to English-speaking races as Indian figs or prickly pears.

Among the numerous known forms of Opuntia there are several species which are very generally known to the Mexicans by the name of tuna. O. tuna and O. ficus-indica are the two species to which this name is more frequently applied, but the common wild varieties or species of flat-stemmed Opuntias are very generally included without distinction.

These cacti are very widely utilized in Mexico and in portions of the United States along the Mexican border in a countless number of ways. The cattleman, after burning the spines from the tender, succulent joints, will feed them to his stock with profitable results; or, in a treeless region, he will plant them as hedges around his corrals or cultivated fields, thus utilizing what in the previous case he destroys—the plant's natural defense against total extermination.

Growing in dry, sandy or rocky soil, they thrive where scarce any other vegetation can exist. Planted around the Californian Missions in the most fertile spots, they attain a most luxuriant growth. Thus, they are naturally adapted not only to thrive in sterile districts and to prepare the barren soil for other classes of vegetation, but they are equally at home under the most advanced stages of cultivation.

The Cactaceæ are without exception, I believe, indigenous to the American continent and the adjacent islands, but the tunas in numerous varieties have become extensively naturalized and are also cultivated with considerable profit in the south of Europe. In Sicily, Opuntia vulgaris is said to thrive in volcanic districts, which would otherwise be barren of vegetation.

The Mexican names nopal and tuna refer to the same species of plants, but nopal refers to the leaf-like stem, while tuna refers to the fruit. From being used to indicate a part only of the plant they have come to be generally applied to the whole.

The tunas, naturalized around the Missions of Southern California, were brought from Mexico by the Spanish padres, who trained them into hedges around the Mission gardens and buildings. They grow from ten to fifteen feet high, producing an abundance of large, well-flavored, edible fruit.

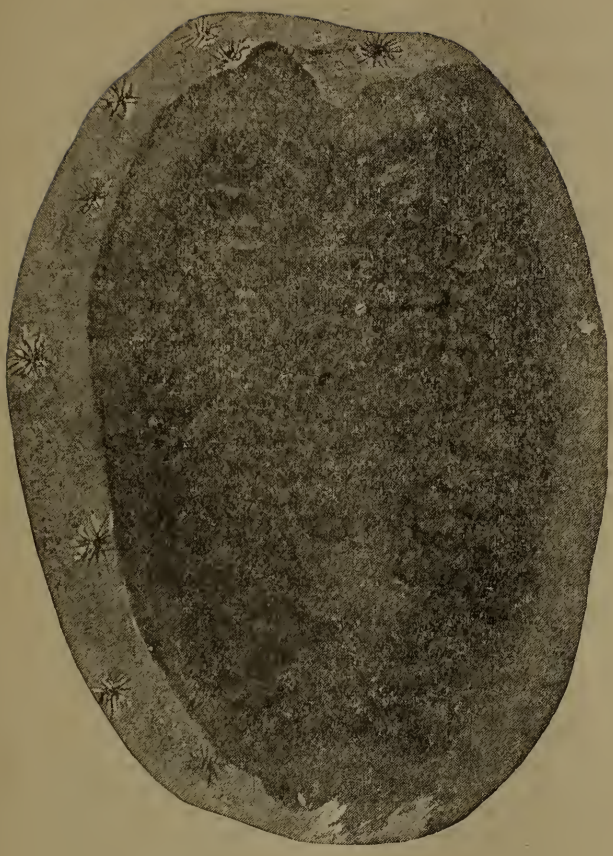
P. W. Reasoner, in the *American Garden* (xi. 532), in writing of 'native Florida cactuses,' gives the following interesting account of the occurrence of two species of tunas in that State:

'Next, and of more importance, is Opuntia tuna. This famous species, so well known as a hedge plant in Mexico and the West Indies, abounds on every high, sandy beach from Tampa bay around Miami, and, perhaps, still farther north on the east coast. It quite often grows in impenetrable masses, four or five feet high, and is characterized by large oval joints, six or eight inches long. It is covered with two sets of spines, some small and chaff-like, but whose close acquaintance is not to be courted, and others an inch or more long, as sharp and strong as needles, and quite as formidable as any cactus we have seen. The yellow flowers almost invariably have a rosy tinge, and the plant is beautiful, both when in bloom and when covered with the large, rich, purple berries or prickly pears.

'Besides its use in tropical America as a hedge plant, it is used as one of the principal cochineal plants. It is quite hardy and will stand several degrees of frost unharmed. The fruits, covered with occasional tufts of small chaff-like prickles, are two or three inches long, somewhat pear-shaped and pumpkin-colored. They are produced in the greatest profusion. We know of an array of glasses of marmalade, and jars of the richest wine-colored sweet-pickles, made from the fruit, and as tempting as an epicure could wish.

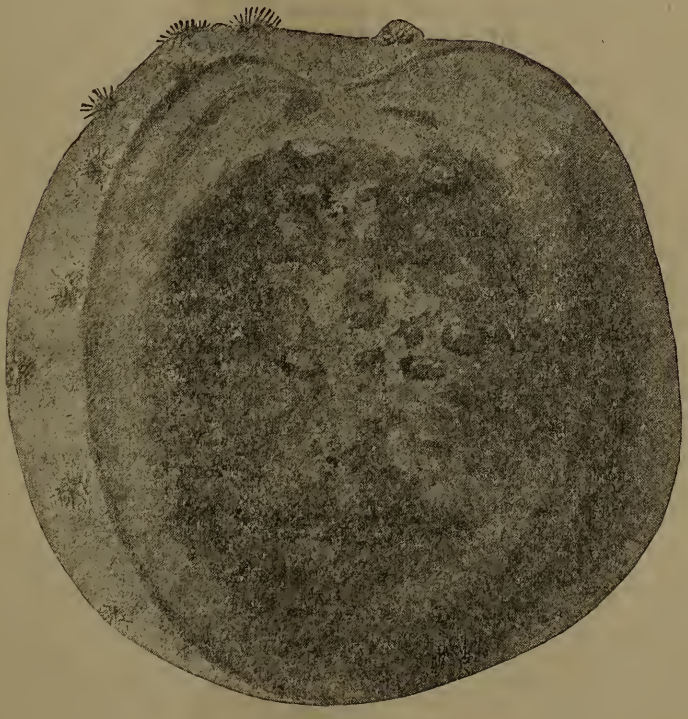
'Equally famous is O. ficus-indica, the 'Indian fig' cactus. This species has escaped from cultivation and has become naturalized in a few places in south Florida, especially on Key West. It, also, is very hardy, and would doubtless prove so in north Florida. It is a most striking and picturesque plant, attaining, in a few years from the cutting, a height of ten or twelve feet, with immense flat joints a foot or even fourteen inches in length. The scale-like spines often drop off and leave the surface perfectly smooth, so it is not very prickly nor difficult to handle. The fruits are larger than those of Opuntia tuna, and are yellow in color. The pulp is sweet and has very few seeds. It is very much liked by most people who are familiar with it, and we have seen those who preferred it to such popular and delicious fruits as the orange and banana The fruits are known as 'Indian figs' in the West Indies, and stray specimens occasionally find their way into the New York market from some West Indian vessel.'

In *Garden and Forest* I have called attention in a note to the possibility that the manufacture of syrup from the fruit of the opuntia may at no far distant day become an important industry in Southern California. The juice of the fruit which these plants produce in great abundance, may be extracted in a cider press like the juice from apples, and boiled down to a fruity syrup indistinguishable in flavor from that manufactured from the watermelon. Excellent vinegar or wine may also be made from the juice. Three



Tuna Colorado.

Wild Tuna.



Tuna Manse.

varieties or more are found naturalized around the California Missions, called the tuna, tuna colorado (red tuna), tuna manse (tame tuna) respectively by the inhabitants of Mexico. They are extensively cultivated in Mexico for their fruits, and a great variety of forms occur in that, their native country. Dr. Edward Palmer, a noted botanical explorer, has contributed an interesting article on opuntia fruit as an article of food to the *West American Scientist* (VI 67), which has been widely quoted and is reprinted in the annual report of the California State Board of Horticulture for 1890, page 133, and elsewhere. In the same report is given a plate illustrating the fruit of the tuna colorado and the tuna manse, and also of the wild tuna (opuntia engelmanni). See engravings used herewith.

Gerald Hastings (*American Garden* XI, 475) says: 'Several species of opuntia, particularly O. tuna, yield the red, green or yellow fruits known as prickly pears. These are sweet and juicy and extensively used as dessert by the Mexicans and inhabitants of Southern Europe. Their juice is used as a water-color at Naples, and for coloring confectionery in the West Indies.

OPUNTIA FICUS INDICA—Haworth.

'During the eighteenth century Mr. Philip Miller, of Chelsea Gardens, England, brought several cacti into notice, at least eight being credited to him and described in his Gardeners' Dictionary in addition to those already known. Martyn's edition of Miller's Gardeners' Dictionary enumerates among others, Cactus ficus indica and C. tuna. Not having access to the above works, I am unable to learn with any degree of certainty as to the characteristics of the types of these species. Apparently the most reliable description accessible to me is in Forster's 'Cacteen,' of which the following is a free translation:

'Native of South America, cultivated south of the Rio Grande under the name Nopal castillano; naturalized in Italy and Sicily; tall, broad-spreading plant, with a cylindrical, woody, thick stem when old (up to 45 cm. long and 30 cm. broad in size), green, thick (2½ cm.), thinner on the edge, elliptical, with small reddish leaves; areolæ regularly distributed, sunken, thornless or rarely covered with a few single, small, bristly, white spines. Flowers large, brimstone yellow. Fruit very large and edible. Grown in large quantities in Sicily for its delicious fruit. Four varieties, with yellowish, blood-red, whitish and seedless fruit respectively, the two latter considered the best.'

The tuna colorado naturalized at the old Mission of San Diego, which I take to be a type of O. ficus indica, produces a rather insipid fruit, not very sweet, mealy, closely resembling in taste and flavor a frozen apple. The color is a crimson lake inside and out, the epidermis slightly dulled by a glaucous blush. Seeds numerous, over 200, easily separated from the pulp. The fruit is ovate, 3½ inches long,

2½ inches in diameter, smooth, with over sixty areolæ of fine spines distributed over its surface, a fourth bordering the deep brownish umbilicus which is an inch across. Spines usually few, short and weak; whitish, often entirely absent.

OPUNTIA TUNA—Linn.

'A native of Mexico and Columbia. Tall, broad-spreading plant, large, rather long (10 to 20 cm.) ovate or elliptical stems, the edges curving, with pointed green leaves seven mm. long. Covered with bunches of spines growing close together at base of stems, and wider apart at top, like gray felt in color, the upper spines brownish-yellow, underneath four to six stiff, bodkin-like, light yellow spines of unequal length (9 to 21 cm.) Petals the shape of rose leaves, mucronate; stamens yellow; stigma five-lobed; green.'—Forster's Cacteen.

The tuna which I take to be this species bears a very juicy, sweet, delicious fruit, yellowish-green when mature, nearly three inches long and two inches in diameter, with fewer seeds (about 150). The greenish-white, firm pulp is very cool and refreshing, from which the seeds do not readily separate as in the tuna colorado. The slightly glaucous epidermis of the fruit is similarly armed with an equal number of areolæ of fine, short spines, very disagreeable, but easily disposed of by an expert—though dangerous to a novice if he should stand to windward while brushing them off the fruit, when they are liable to blow into the eyes with disastrous results. The average Mexican or Indian learns to handle these fruits with utter indifference to the spines.

The spines are abundant and rather formidable in appearance on this beautiful plant, but are really one of the most useful characteristics of the plant, making it very useful for hedges and fences.

OPUNTIA TUNA MANSE.

The color of the fruit of this tuna outside is of a deep orchraceous-buff, slightly glaucous, irregularly mottled and blotched with crimson, giving it a bloodshot appearance; inside the outer coating is of the same coloring, but the pulp inclosing the seeds is of a light greenish-yellow.

This is the most abundant of the three forms of tunas naturalized at the San Diego Mission, and like the others is credited with a Mexican nativity. The fruit is nearly globose, with a yellowish umbilicus, pitted in the center, an inch in diameter and smaller proportionally than in tuna or tuna colorado. Seeds more numerous (about 250). Areolæ and spines on fruit and stems differ but slightly if any from O. tuna, from which the plants may not be readily distinguished except when in fruit. *C. R. Orcutt.*

A VISIT TO LAKE MAQUATA.

It was in August, 1884, that I first learned of the existence of Lake Maquata. Leaving the forest of the piñone pine (Pinus Panyana), on the table lands of northern Lower California, behind us, my father and I had descended the abrupt eastern slope of the mountains, into the great Cantilles cañon, among thousands of lovely Blue palms and stately Washington palms that line the bottom of this famous cañon, which justly rivals the Yosemite in the beauty and grandeur of its scenery.

Near the mouth of the cañon, our Indian guide, Captain Jose, told us of the big lake beyond us where thousands of large fish might be had for the catching. He described the fish as fully two feet in length, and very good eating, but told us in Spanish it was a 'long ways'—I think he said five leagues. We could not prevail upon this unusually intelligent Indian to accompany us to the shores of the lake, and rather reluctantly we retraced our steps from the land of the palms to the region of the pines.

It was in July, 1884, that the Colorado river floods inundated extensive portions of the New river district, and other sections of the great Colorado basin, or desert, as it is commonly called. Where the Colorado river mingles its water with the Gulf of California are many millions of acres of fertile, alluvial lands but slightly raised above sea level. With a high tide in the Gulf the Colorado river back-waters, and in seasons of unusual summer floods overflows its banks near its mouth for many miles. New river thus had its origin, the overflow forming a channel for itself from the banks of the Colorado, in a northerly direction, to the lowest portion of the great depressed basin, which at Salton, on the Southern Pacific railway, is two hundred and fifty feet below the level of the sea.

Laguna Maquata is a smaller depressed basin, within the area of territory known as the Colorado desert, its northern end lying perhaps ten miles south of the United States boundary, in the Mexican territory of Lower or Baja California, between the Peninsula and Cocopah ranges of mountains. Its surface is doubtless below sea level, but the sediment deposited by the muddy waters of the Colorado has created a permanent barrier between it and the Gulf of California, whose waters in the pliocene age unquestionably rolled over the whole region for fully two hundred miles north of its present shores.

In January and February, 1890, in explorations on horseback on the Colorado desert, I came several times into full view of a portion of Laguna Maquata, which on maps of Baja California is usually designated as *muy salada*—very salt. At that time it was entirely dry, at least as far as my members of the party I was with could observe in closer inspection which they gave it. Probably in no place does the lake exceed a few—say five—miles in width, but in length, this then dry lagoon apparently extended to the southward for

sixty or seventy miles, along the western base of the Cocopah mountains—a low range of barren hills of forbidding aspect. Along the shores of the dry lake were found numerous remains of the unfortunate fish, the former denizens of the defunct lagoon. All the skeletons observed were of the mullet (Mugil Mexicanus), and of these the coyote, or desert wolf, had left but the barest evidence.

Millions of fresh water snails and clam shells were strewn over the bed or along the former shores of the lake, sufficient evidence that it had once been filled with fresh water.

During the summer of 1890, apparently reliable reports reached me to the effect that the Colorado river had again overflowed its bank, inundating anew the New river country as in former years, and filling to the brim the Laguna Maquata with water teeming with fish—like unto the season of 1884. The barren, but naturally fertile, desert plains had been transformed—so ran the reports—into a jungle of tropical luxuriance, a Paradise for man or beast. The mesquite trees were loaded with their crisp bean pods, the grass was growing as high as a horse's back, and all the sloughs and lagoons were full of water and delicious fish.

With the coming of cool autumn weather, early in October, I again entered the confines of the Colorado desert with a suitable outfit and an efficient companion. En route from San Diego we had received slightly conflicting reports from parties who claimed to have recently crossed the plains of the desert from Yuma, Arizona. Several white men affirmed that there was an abundance of fresh water both in the lagoons of New river and in Maquata lake. One aged Mexican, whose acquaintance I had previously made, kindly advised me to depend on the large cañons in the Peninsula range of mountains for my water—not on lake Maquata. I learned that a friend of mine, with nearly twenty years' experience in the region, came near perishing from not finding water at *Las Posas de los Indios*—Indian wells, while others reported an abundance of water in the adjacent lagoons. The water at Coyote wells, however, was universally condemned as unfit for man or beast, from being so strongly impregnated with the deadly alkali.

Reaching the ruins of the old Rock house, on the Summit station on the old Ft. Yuma and San Diego stage line, we filled our cans with the pure water from the mountain springs—a solitary spring in the solid granite, really about half way between the desert plains and the summit of the first barren mountain ridge. The 'nine miles' from here to Coyote wells, through a deep, rocky cañon and over a sandy plain, proves to be fifteen long and weary ones. At Coyote wells the dark-colored, repulsive pool of water would have been a delight to the thrifty New England housewife, since, with it, she could easily dispense with her ash barrel and lye! Two small mesquite trees alone mark the vicinity of Coyote wells, the old adobe stage station being completely razed to the ground, and the alkali

plains are otherwise almost destitute of vegetation. A little patch of salt grass (Distichlis maritima) grew in the vicinity of one of the mesquie trees, and here my former acquaintance with the region stood me in good stead, for I knew that comparatively good water could be obtained in this vicinity. Cleaning out a small hole near the tree, by the moonlight (we had reached the place just at dusk), I had the pleasure the following morning of finding a limited supply of water, sufficient for our needs. It was very suspiciously sweet at first (alkali water is sweet to the taste) and we had to use it sparingly, but after a while it became sufficiently pure for us to drink with impunity, after we had dipped it dry a dozen times or more.

The first night our horses were without hay, and had only a feed of grain. Of necessity we hitched them to one of the mesquites, and by morning we found they had gnawed off all the bark on the trunk of the tree that they could conveniently reach, and eaten the twigs and leaves that were in reach also. The day after our arrival we traveled to the southward over the desert for two or three miles and cut a supply of hay with our pocket knives! The only true grass in this arid region of agricultural value is a very rigid species, that grows in scattering clumps, one to three or four feet high, and generally called gietta (Hilaria rigida). This grass is very nutritious, rich in the starch elements, and very brittle. It is not specially attractive at first to horses or cattle, but they soon learn to eat it with avidity, and a single cluster is often sufficient for an animal for a night. A stout grubbing hoe is the best implement for the haymaker when harvesting gietta, but a pick is almost equally useful, or in the absence of either it can be easily broken off with the foot—but the foot needs to be well protected by a heavy boot in the latter case!

Leaving Coyote wells early the following morning, after we had completed our haying, we travelled to the southward over a but little travelled natural road, sandy and gravelly or stony in places, toward Signal mountain—the northern end of the Cocopah range. We came in sight of the Maquata basin early in the afternoon, the lake being some thirty miles from Coyote wells, and became convinced that reports of water in the lake were true, a long and narrow strip of water being plainly visible along the western base of the Cocopah range and glistening in the sunlight. Evidently only a portion of the lake bed, however, was thus covered with water, but as we approached the shores of the lake our anticipations rose higher and higher.

As we approached the shores of the lagoon we traversed broad sandy arroyos in which numerous ironwood trees (Olneya Tesota) were growing. Nearer the lake were a few shrubby clusters of mesquite, but only occasionally was a bean pod visible. Arrow weed (Pluchea Corealis) and mock willow, and a few other plants usually considered good indications of fresh water, were soon observed. These plants grew in considerable luxuriance, and fresh water may

almost invariably be obtained by sinking wells in their vicinity at less than twenty feet depth.

Leaving the belt of mock willows we drove into the hard sun-baked bed of Laguna Maquata proper and struck out straight for the nearest visible water. A mile was traveled in silence, yet another mile, and still a third, and then the truth burst upon us. We were following the deceitful wiles of the ever alluring, ever delusive mirage! We were still, apparently, as far from the edge of the water, which at first appeared scarce half a mile distant, as when we started, and when we stopped our team in disgust, the beautiful phenomenon revealed itself to us fully.

Gradually, like a bank of fog, it receded to the southward, and rose above the surrounding banks of the lake. Fantastically shaped rocks seemed to rise up in the background, and a vision of a city in the desert might well have been imagined. Many a time before had I seen this interesting phenomenon and equally as inviting, mythical lakes of water, but never before had I been so thoroughly deceived and misled. Well might a lonely wanderer on the sands of the desert, half crazed by the heat and thirst, be enticed on to his death by such a deception, though in rational moments one acquainted with death by the region would not be thus cruelly defrauded.

The surface of the lake bottom was bare of vegetation, but strewn with fragments of fish bones and fresh water snail shells in countless millions. Now and then a coyote could be seen leisurely trotting along on his way home from dining out, or perhaps in search of his supper—or both.

Driving to the westward toward the Peninsula range, we soon left the bed of the lake behind us, and entered a series of sand dunes like those on our ocean beaches, that seemed to border the western shores of the lake far to the southward. Among these sand hills absolutely no vegetation was observed, but now and then fragments of salt water clams or snail shells were found, particularly of the genera venus and cerithidea—probably the last organic vestiges of the former dominion of the sea over this region. Beyond these sand dunes we reached a mesa-like formation, resembling the famous citrus lands of Southern California. Here on a little rise or prominence, near a patch of luxurious gietta grass we decided to camp for the night, and leaving my companion to prepare our evening meal, I started to search for water in the cañon a few miles distant.

It was a little after three in the afternoon when I left the wagon on my self-imposed quest. If water was not found I knew that in the morning we should have to retrace our steps to Coyote wells, as our water supply would by that time be exhausted. As we left the bed of the lake we had seen what appeared like water in the same direction as at first observed, but after our experience with the mirage we were naturally skeptical. Near the summit of the Peninsula range, in one of the long cañons on its abrupt eastern slope, we

had also observed what was unquestionably pure running water, but it was too far away to be practically available for our needs, except in dire necessity.

Taking my bearings in relation to the more prominent landmarks afforded by the mountains surrounding the vast amphitheatre in which we were encamped, I started in a direct line for a huge finger rock that rose perhaps a thousand feet above the plains, near the mouth of one of the great cañons that rise in the pine country on the top of the Peninsula range. In light walking trim, with only a small canteen partially filled with water, and my light pick, which answered well for a cane, it took me to nearly seven o'clock before I had reached the foot of the mountain range. After traversing the plains for two or three miles I had struck the fresh trail of five or six deer, which greatly encouraged me as they were travelling in the same direction as I had planned to follow, and were evidently going to water. I consequently followed this trail as long as daylight lasted, but lost it before the stars came out distinctly.

About this time, when daylight vanished, I realized the fact that I had not dined. During the whole day I had felt not the slightest inclination to drink, but having left water behind me I felt an insufferable thirst, as if I could have easily emptied a gallon canteen. But a little water remained in my canteen and this I decided to husband in case I should be unable to return to the wagon in the dark before morning. Fortunately, however, I just then run against a tall cactus belonging to the genus Echinocatus, and by the aid of my pick I cut a generous slice out of its top, and removing the spines and skin I found a refreshing repast at my hand. The crisp, fleshy pulp of this cactus will quickly allay thirst and is an important article of food with the Indians. The Mexicans make a preserve of it similar to the citron of commerce. It is juicy and tender, and the first taste was as grateful to me as an apple would have been, and, after satisfying myself, I put a chunk in my pocket for future use if desired.

Thinking that I must be near to water, I ventured on by the starlight (the moon I knew would not rise before morning), but after stumbling over huge bolwders and crossing a ravine where I had to descend a nearly perpendicular bank, twelve or fifteen feet in hight, I decided that it was unwise to continue my exploration for water. Following down one of the sandy arroyos till I came to the open plain, I took my bearings the best I could from the stars—the mountains, which I had at first depended upon as landmarks, having disappeared or become unrecognizable in the dark, and was soon making a bee line for camp.

Once I stumbled against a dead cactus which had been washed down from some of the cañons I had left behind, and from the persistence of the spines, which quickly developed an attachment for my leg, I was made rather painfully aware that it belonged to the

genus Opuntia—which I always detested. Fortunately the open plains of the desert which I had traversed were nearly destitute of cactus growth or this experience might have been repeated oftener than agreeable. Once a diminutive fox crossed my path, and followed me for a ways a few steps behind me, but no other sign of animal life was encouutered.

About eleven o'clock I caught sight of the light of a lantern on my wagon, nearly a mile away, and directly in line with the star which I had been using as a guide for several hours past, and I soon joined my companion and we had turned in together for the night—or for what remained of it.

After sunset my friend and I had both observed that there really was water in the lake, as the phenomena of mirage are visible only by sunlight. I had, however, previously decided that the mirage had doubly fooled us, and had led us away from the genuine water. Early the following morning, therefore, we again faced the water, and in an hour had approached as near the edge of the lagoon as the muddy margin along the water would permit with a team. Approaching nearer on foot I finally reached the water, which at the outer edge was scarce a quarter of an inch deep. Digging a hole in the mud and allowing the water to accumulate I was able to dip up a little in my hands and to taste. One taste was enough. The Mexican maps were correct—it was *muy salada*, in fact, as salt as ordinary brine is usually made, rendered much salter by evaporation than the water of the ocean.

On the further bank of the lagoon, which was probably considerably deeper than the shore I visited, there was a flock of birds resembling sea gulls, but at the distance of perhaps half a mile or a mile (so deceitful are the distances) I could not positively identify them. We spread not our net for the wary fish in this dead sea of the new world, we fired not a shot, we cast not a line, but silently and quickly we turned our faces in the direction of the north star, and made the best time practicable back to Coyote wells. Brilliantly shone the sun above our heads and sent the thermometer in the bottom of our grub box above 100° F. Old Boreas, as if to celebrate our return, gathered from far and near, and concentrating his forces around Coyote wells succeeded well in diverting our minds from the ignominious end of our fishing (or rather, botanical) excursion to the land of Laguna Maquata. My companion could not light his fire, and we went supperless to bed—he could not even light his pipe, and consolation there was none.

The next morning, after a day of fasting in the wilderness in good earnest, we enjoyed a hearty breakfast and set our faces into the west where lies San Diego. That night we camped at Dos Cabesas springs, which proved to be the manufacturing and distributing centre of winds and cyclones for the Pacific coast. A little stout hut of stones proved a very agreeable place of refuge from the wind and ra

which succeeded the typical sandstorm of the desert, while the pure mountain water which flowed from the granite cliffs somewhat reconciled us to our fortune. Thus ended a visit to Laguna Maquata.

C. R. Orcutt.

PACIFIC COAST BULBS IN THE EAST.

(From *Garden and Forest*, iii. 480.)

Many of the species of Calochortus and Brodiæa from the Pacific Coast, especially those from California, are somewhat difficult to manage in our cold Eastern climate. The ocean currents of that coast have such an influence on the climate that even in the northern portion of Washington along the coast the winters are quite mild as compared with the same season further east. Some of these bulbs when wintered in an ordinary cellar begin to grow about the last of February, and by the time the ground is ready for them in spring this early growth has so exhausted them that they have little vigor left. They are not hardy, and if planted in autumn without protection will not survive our severe winters. Perhaps a very cool cellar might prevent this winter growth, but I question it. The only way I have been able to flower many of them has been to plant early in autumn and protect with three or four inches of leaves. If planted before the weather is too cold they become well rooted before winter. I believe that most of them will bear some freezing, and it seems to me that it is the alternate thawing and freezing of plants that winter kills so many. If they can be kept from thawing before spring after they have once been frozen, the cold is not so injurious. By covering them with three or four inches of leaves, though not enough to keep out all frost, they will remain frozen and dormant until it is time to remove the covering in spring.

Mexican bulbs are quite different in their manner of growth, and may be wintered in a cellar with perfect success. They will not usually start to grow before the last of May or first of June, even if planted as early as the ground can be prepared in spring. The Fritillarias from California and Oregon have done much better planted in autumn and treated in this way; and the lilies, though much more hardy than the other bulbs, seem to do better when covered. No doubt deep planting may answer for some of them, but if the soil is of the right kind I would prefer to plant five or six inches deep, with a light covering, to eight or ten inches.

Most early-flowering plants, if not all of them, should be plante early the previous autumn. August or July even, is not too early for some of them. The Dog's tooth violets, Chionodoxas, spring beauties, Trilliums, etc., are never as strong the first season when planted in spring or late in autumn as when set in August and September. They do not flower so early nor last so long.

The lilies from the Pacific coast are most of them early bloomers,

in flowering Lilium Washingtonianum or L. Humboldtii when planted in spring, and they seem to require more time to become and should be planted in early autumn. We have seldom succeeded established than most plants. L. pardalinum has been the hardiest species. In a light loamy soil L. parvum and L. rubescens do finely, but in clay or clay loam they refuse to thrive. L. Parryi is a more southern species, yet it seems hardy with deep planting, and is not hard to grow. Its beautiful canary-yellow flowers appear with those of the earlier flowering sorts. It needs more moisture, however, than the other species. *F. H. Horsford.*

EDWARD M. HAIGHT.

It is with deep sorrow that we have to record the early death of our valued friend and associate, Edward M. Haight, late of Riverside, California, on the eighth of May, 1891, at the home of his father, Mr. A. D. Haight. E. M. Haight was born in Mound City, Kansas, removing to Riverside with his parents over fifteen years ago, and at his death was twenty-eight years of age. He was of a retiring disposition, devotedly atttached to his chosen studies in the natural sciences. Ornithology and oology were his favorite branches, and he was widely known as a taxidermist and naturalist. The *Golden State Scientist* and the *Collectors' Illustrated Monthly* were magazines issued by him for a time, and later he purchased the *Old Curiosity Shop*, a monthly, which he was compelled to dispose of on account of failing health.

He gained many personal friends, and his loss will be felt by a large circle of correspondents, among whom he had gained a reputation for honest dealing. *C. R Orcutt.*

CROTALUS PYRRHUS IN CALIFORNIA.

One of Mr. Orcutt's most interesting additions to the herpetology of California is the rattlesnake mentioned in the above heading. It belongs to the group characterized by the rostral and prenasal being separated by small scales and not in contact with each other.

So far as I am aware only six specimens of this snake have ever been collected. The type was obtained by Dr. Elliott Coues in Cañon Prieto, near Fort Whipple, Arizona, and was described by Professor Cope in 1866 (Proc. Phil. Acad., XVIII, pp. 308-310) as Caudisona pyrrha. It was afterwards figured in the fifth volume of Wheeler's Report on the Explorations and Surveys west of the 100th meridian, pl. xxii, although at the time of the publication of that volume it was supposed that no specimen was collected by any of the parties of Wheeler's expedition. However, it was afterwards found that a head of a small specimen sent home by Dr. O. Loew from the Mojave Desert, Arizona, belonged to this species. We next

hear of a specimen in Dr. T. H. Street's account of reptiles collected by him during the cruise of the U. S. Steamer 'Narragansett,' engaged in the survey of the coasts of Lower California (Bull. U. S. Nat. Mus., No 7.) A large specimen (total length 1.070 meter) was captured on Angel Island in the Gulf of California and deposited in the National Museum. The fourth specimen was obtained in the same place by Mr. Chas. H. Townsend during the visit of the U. S. Fish Commission Steamer Albatross in 1889 (Pr. U. S. Nat. Mus., XIII, p. 144) and is likewise one of large proportions (length 1.230 meter).

These were all the known specimens up to 1890, during which year Mr. Orcutt obtained two specimens in the Colorado Desert, San Diego Co., Cal., which with usual liberality he presented to the National Museum. One of these, a fine example, intermediate in size (0.940 m.) between the type and the large specimens from Angel Island, was caught 'near Mountain Springs' in June, while the other, a much smaller individual (0.480 m.), with a head about the same size as that collected by Dr. Loew, from the same locality, was collected in October. These are, so far, the only Californian specimens.

The species received its systematic name from the unusual color of the type specimen, which is described as being 'pale vermillion' (though in another connection the 'general tint' is said to be 'bright salmon red') 'varied with yellow on the sides of the belly, with numerous large reddish-bay hexagons, which become transverse bands on posterior two-thirds of length; yellow below.' Though having been kept in alcohol for more than twenty-five years the specimen still retains a good deal of its original brilliancy.

None of the specimens obtained since show a similar coloring. So far from being 'red' rattlesnakes, they are decidedly 'white,' and in Mr. Orcutt's letter his specimens are in fact referred to as the 'white rattlesnake.' In all of them the ground color is a slightly buffy white, more or less sprinkled with black dots, giving it a kind of 'pepper and salt' appearance. The large blotches on the back are very wide (transversely) and of a brownish clay color, becoming brighter posteriorly; the borders of these blotches are marked with more or less isolated blackish spots. In Dr. Street's report the paleness of his specimen is attributed to fading in alcohol, but as Mr. Orcutt's specimens were received quite fresh, it is evident that it is the type which is unusually colored and not the others. As might be expected, the markings are better defined in the smaller specimens than in the two larger ones from Angel Island

The affinities of the present species are decidedly with Crotalus mitchellii from the southern extremity of Lower California, as already pointed out by Prof. Cope. Garman has referred it to C. confluentus as a variety, at one time even expressing the opinion that it might be only an individual variation, bnt the additional material proves its distinctness from C. confluentus and nearest allies beyond

a doubt But whether the acquisition of more specimens may not eventually result in the necessity of uniting C. pyrrhus with mitchellii is another question.

The original character relied upon for the distinction of these two species, viz.: The number of loreals, there being one in the type of C. mitchellii and four in that of C. pyrrhus breaks down upon an examination of the specimens which have come to light since. In this respect Mr. Orcutt's larger specimen is particularly interesting inasmuch as on one side of the head it has a very long lower preorbital, the condition which obtains in C. mitchellii, while on the other side this plate is divided as in the other specimens of C. pyrrhus.

I have not the type of C. mitchellii at hand now, but a second specimen was collected by Mr. L. Belding, at La Paz, L. C., in 1882, and judging from this the chief difference seems to consist in the double row of small scales interposed between the rostral and the prenasal, while in all the known specimens of C. pyrrhus there is only a single series. By this means the nostrils in C. mitchellii appear to be placed further back, and the space between nostril and eye is correspondingly shortened. *Leonhard Stejneger.*

NOTES ON PACIFIC COAST PLANTS.

(From *Garden and Forest*, iii. 286, etc.)

One of the prettiest Brodiæas we have seen came from Oregon under the name of B. Hendersoni. Its flowers, six to twelve, are in an umbel three-quarters of an inch wide, creamy white with a yellowish centre. A prominent dark purple stripe runs the whole length of the sepals both outside and inside. The leaves are from the base, long and narrow, and the naked stem is about a foot high. It would be useful for cutting.

Another showy little plant is the Allium serratum, from California. It is about ten inches high, with a naked stem and a many flowered umbel of rose-purple flowers half an inch wide. Like our A. tricoccum the leaves die down at time of blooming, leaving only the flower-stalk visible. It may not be hardy. Ours were covered with leaves during the winter.

Calochortus pulchellus, now in bloom, has pretty nodding yellow flowers an inch wide, on short stems. The plant is low, only four to six inches high, bearing in succession two to five flowers. It is not suitable for bouquets, but is well worth growing as a garden plant. It probably needs protection in winter.

Geranium incisum, from Oregon, is also a pretty species, with rose-purple flowers, with darker stripes [than G. naculatum], an inch wide. The plant is usually about a foot high, is hardy and well worth growing.

Brodiæa multiflora bears a close, round umbel of sessile, bluish-purple flowers half an inch wide, but they are so close together that

they have a different appearance from most of the Brodiæas. The long naked stems grow about twenty inches high from a bulbous root, and the leaf is long and grass-like. It is a strong-growing species, but should be protected in winter.

Allium folcatum, from Oregon, grows only four inches high, but its umbel of dark rose-purple flowers is very large for its height. The flowers are about half an inch wide. The divisions of the flower are very narrow, which gives it an odd appearance. Its very short stems make it worthless for cutting, but it is an interesting garden plant, remaining a long time in flower. It is probably not hardy.

Allium acuminatum is usually a low plant, six to eight inches high, with a good-sized umbel of pretty rose-purple flowers. The flowers are half an inch long, and about as wide at the opening, on pedicels three-fourths of an inch in length.

Zygadenus venenosus has a bulbous root and long grass-like leaves. Its flowering stem is usually a foot or more high, almost naked, and bears at its summit a dense short panicle or head of nearly white flowers a third of an inch wide, and having a yellowish centre. It is perfectly hardy in this climate, and will do well in light or heavy soil in the sun.

Allium hæmatochiton, from Southern California, is a small species, six or eight inches high, bearing an umbel of six to twelve small white flowers with greenish stripes and reddish-brown centre. It is a tender plant and should be wintered in sand in the cellar.

Camassia esculenta, now in flower, grows from ten to twenty inches high, with long, grass-like leaves from near the root, and bearing at the top a loose spike of violet-blue flowers, five inches long. The flowers are an inch or more wide and there are from ten to twenty on a spike. These are valuable for cutting. The bulb is easily wintered by protecting with a thin covering of leaves.

Too much cannot be said in favor of the white California Trillium (T. sessile var. Californicum), with beautiful dark green leaves, and large, almost pure white petals, often two inches long by three-fourths of an inch wide. The durability of both flowers and foliage and its perfect hardiness makes it second in value to T. grandiflorum alone. *F. H. Horsford.*

FRITILLARIA RECUROA.

(From *Garden and Forest*, iii. 264, May 28, 1890.)

Fritillaria recuroa, which has been mentioned in a former number of this paper, is now in bloom, and it is certainly one of the most attractive plants from the Pacific coast. The plant can be grown readily in a light loamy soil, with a thin protection in winter. It blooms early, and its scarlet, lily-like flowers are of long duration, and it will be useful for cutting. *F. H. Horsford.*

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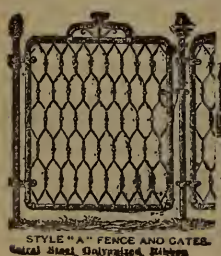

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JUL 22 1891

EPIPHYLLUM.

(From the *Rural Californian*, xiv. 133.)

The Crab cactus is one of the most beautiful of garden plants, both for the clear green color of its tender, succulent stems and for the brilliancy of its flowers which are borne in great profusion during a large portion of the year. The genus Epiphyllum was established by Dr. Louis Pfeiffer, and contains but two or three species at most, by many botanists being in reality considered a monotypic genus. The stems are slender, succulent, leafless, and short-jointed; the joints somewhat flattened, two to three inches long and one or two inches broad. The flowers are produced from the points of these branches and not from their margin as in Phyllocactus.

The crab or lobster cacti, as they are popularly called, are natives of Brazil, where they are usually found growing upon the branches of trees as epiphytes—not parasitical—deriving their nourishment from the air. In cultivation it is a common practice to graft the Epiphyllum upon the stem of a Pereskia or some hardy stout growing cactus, by which an effect is produced not dissimilar to that of its natural condition, the slender jointed stems attaining a length of three or four feet and growing in a very pleasing, graceful manner.

This cactus may be easily propagated by cuttings or by grafting as above or from the seed. New and very beautiful forms are often obtained from seed and the number of varieties which have thus become known in cultivation is very great. Cuttings of two or more joints readily strike root at any season in pots of rather sandy, dry soil and placed in a warm situation.

Grafting on a Pereskia stock or on Cereus speciosissimus is the most popular method of treatment for increasing these plants, as by that means the drooping habit of the Epiphyllum is more gracefully and pleasingly displayed.

Pereskia aculeata is a strong, quick growing cactus with leaves like those of an orange tree, popularly known as the Barbadoes gooseberry. It is upon this plant that the Epiphyllum is usually grafted, and as it rapidly absorbs the moisture and nutriment from the soil it is advisable to fertilize the ground thoroughly. About one-fourth of the bulk of the soil in which it is planted has been recommended as a good proportion, and when supporting a large head of the Crab cactus the soil may be further enriched by a top dressing or the application of liquid manure from time to time, especially when the Epiphyllum is in bloom. After flowering the soil may be allowed to become partially dry until the plant resumes its natural growth after a few weeks of rest.

EPIPHYLLUM TRUNCATUM Haworth.—This is the type of the genus and by some counted as the only species—the two following species being considered mere varieties of this by many botanists. It has been in cultivation in Europe for nearly a hundred years and

was introduced into England from Brazil early in the nineteenth century. The original form is said to have had dark crimson flowers with a white throat. One of the varieties early imported was of a "uniform rich crimson hue" and was figured in the *Botanical Magazine* in 1825. About 1840 a variety (violaceum) with a distinct tinge of violet was first known in England.

EPIPHYLLUM.

Among the numerous varieties which are now in cultivation, the result of natural variations in seedlings, perpetuated by cuttings or grafting are the following—known hybrids are marked with an asterisk (*):

*1—Majus; flowers large, of a deep rose color.

2—Bicolor; flowers white, margined with delicate rose.

*3—Coccineum; a very beautiful form, with brilliant deep scarlet flowers; very rich in coloring.

4—Bridgesii; dull violet, petals of a dark violet or purple; a prolific bloomer with richly colored flowers.

*5—Cruentum; dark-purplish red flowers.

6—Magnificum; large white flowers, with rose margined segments, tips of petals bright rose.

*7—Albolateritium; petals silky white, margined with brick red.

8—Amabile; white and faintly tinged with purple or crimson; an elegant form.

9—Aurantiacum; reddish-orange, large and brilliant.

*10—Purpureum; deep purple.

*11—Roseum; bright rose; very handsome, with streaks of deep red on the sepals.

12—Rubrotinctum; white and purplish-red flowers.

13—Ruckerianum; purplish-red, tinged with violet, with a rich violet center.

*14—Splendens; a fine form, with deep rose flowers.

15—Spectabile; white flowers, margined with purple.

16—Salmoneum; salmon-red flowers, tinged with purple.

17—Tricolor; flowers of a deep reddish-purple and white.

18—Violaceum; silvery-white flowers, margined with light purple. A large flowered form (grandiflorum) and a form with pure white flowers with a deep purple edge (superbum) are highly valued.

19—Guedeneyi; a remarkable form, perhaps a good species 'with pure white flowers three to four inches in diameter and exhaling a most delightful odor.'

20—Elegans; a superb red and purple colored flower, bright orange-red with a center of rich purple.

Some of the above forms may perhaps be worthy of specific rank, but as long as their origin and natural characteristics remain unknown they are best treated as varieties. These plants are all natives of the Organ mountains in Brazil, where they are found usually at an altitude under 4000 feet elevation, growing on trees in the vast forests of that region, not as parasites (as stated by some authors) but as Epiphytes—that is, deriving their nourishment from the moisture laden atmosphere and not from the host trees, where they are merely lodgers, not boarders.

Epiphyllum Russellianum Hooker.—This differs from the preceding species in more slender branches and larger flowers of a generally lighter color. The segments of the flowers are straight and narrow, not reflexed as in E. truncatum. In its native forests it seems to reach a higher elevation, having been found up in an alti-

tude of 6000 feet in the Organ mountains. It is a profuse bloomer, the flowers three or four inches long, of a clear rose-crimson. It was discovered by Mr. Gardner and named in honor of the Duke of Bedford to whose famous collection of cacti the first plants were sent about the year 1839.

Mr. Gardner's account of its discovery is interesting and is herewith copied from Lewis Castle's little book on Cactaceous Plants:

> Through dense masses of bamboos with stems often more than half a foot thick and sixty to seventy feet high we had to cut our way up the Organ mountains till we came, after a toilsome day's journey, to a small waterfall, where we encamped for the night. On the trunks of the large trees growing near this spot I saw abundance of Epiphyllum truncatum beautifully in flower; and higher up the mountain next morning I found a lovely new species belonging to the same group as E. truncatum and much resembling it in many points, equally large, but with a more graceful mode of growth and lighter colored blossoms, the stamens, too, being uniformly pink.

EPIPHYLLUM TRUNCATUM.
Grafted on Cereus colubrinus.

This species blooms at a different period of the year than E. truncatum naturally, and by hybridizing varieties have been produced that remain much longer in flower than either parent.

The following distinct varieties of this have been in general favor in cultivation and are believed to have mostly originated by cross fertilization with E. truncatum or by other hybridization. Those indicated with an asterisk (*) are known hybrids:

*1—Rubrum; flowers of bright rose, double the size of the typical form.

*2—Cupreum; flowers smaller, of a 'coppery tinge, suffused with purple.'

*3—Superbum; 'the purple of E. Russellianum and the reddish tinge of E. truncatum are beautifully blended' in this form of hybrid.

*4—Snowii; is a very pretty hybrid, raised by Mr. Snow, an English gardener.

5—Gaertneri; flowers bright scarlet. This appears to be a hybrid between an Epiphyllum and a Phyllocactus, but its origin is unknown.

Epiphyllum Altensteinii Pfeiffer. — The third recognized species of the genus has longer and slender stems than E. trunca-

tum, with flowers of the same form, with reflexed segments of a pale pink or rose color, sometimes (?) 'tipped with purple.' It is comparatively rare in collections and consequently not so well known as the two preceding species, though equally attractive in appearance. It seems equally deserving of specific rank.

No collection of tropical plants however choice, but that would be enhanced in value by a representation of these elegant plants, which, when covered with charming pendant blossoms of brilliant tints or of delicate subdued shades, are scarcely surpassed by any greenhouse plants. For a window garden, conservatory or lawn, as an edging in beds, in small pots or hanging baskets or in more elaborate combinations the Epiphyllum is equally pleasing and graceful.

In England this plant is made useful in many curious combinations. Pereskias, in one instance recorded by Lewis Castle, were trained to a height of twelve or more feet against the wall and up the roof of a house, and an Epiphyllum grafted thereon at intervals of a foot. And these in time formed good heads, producing a magnificent effect, clothing the roof and walls of the house with the pendulous stems and a mass of richly tinted bloom. Pyramids several stories in height are produced by a similar method of grafting, and while some may prefer less artificial effects, yet they are well worthy of the florists' art, and are in fact but one way of imitating the work of nature. They have rapidly and deservedly advanced in the last few years from comparative obscurity into an increasing popularity among all classes. *C. R. Orcutt.*

ACORNS IN TREES.

(From the *Ornithologist and Oologist* xvi. 64.)

I have read that the California woodpecker sticks acorns in the trunks of trees in order that they may rot and so attract insects. I have had an opportunity to investigate this matter a little in the last few months, and as yet have not been able to find a single insect in these acorns. The acorns are very often cracked or split in two, and only half an acorn put in each hole. The object of the bird seems to be to let the nut become soft or start to decay, and then feed upon it. I have examined the gizzard of several of these woodpeckers and have found the acorn meat in them. All the holes made by this bird that I have seen were made in the trunks and larger branches of the live oak trees. They all seemed to have been used for years.

These woodpeckers have the same habit as the Lewis woodpecker, with which they associate, of perching on the top of the large sycamore and live oak trees, from which they dart into the air after insects and return to the same spot in the same manner as the fly-catchers do. *E. D. Kimball.*

DAVID STARR JORDAN.

DR. D. S. JORDAN.

Stanford University starts out with every prospect of becoming the great educational center of the far west, if not of the whole United States. It has by far the largest foundation endowment of any university in the world, and many old and noted institutions have received in all their history less than this university of the Golden State has at the start. Senator Stanford and wife, by deed of trust in 1877, conveyed to the use of the university their magnificent estates, comprising 83,000 acres of the finest wheat and fruit lands in the State, cash enough to complete all the buildings and enough more to make the total endowment at least $25,000,000. All this as a memorial to their dead son.

For president of the institution they have selected Dr. David Starr Jordan, almost a giant in body as in mind, and he is now organizing the faculty which is to be composed of the most eminent specialists to be found in the world. Dr. Jordan was born in Gainesville, N. Y., about forty years ago, graduated at an early age from Cornell university, and soon became noted for scientific investigations, especially in ichthyology. After experience as teacher and lecturer in various places, Dr. Jordan, in 1875, became professor of biology in Butler university, Indianapolis, and in 1879 was chosen president of the Indiana State University at Bloomington, a position he held until called to preside over the destinies of Stanford University. As an author he is well and favorably known. His numerous memoirs on fishes, and his 'Fishes of North America' in which every fish known to inhabit our waters is described, (with Dr. Gilbert's co-labors) are well known to every person interested in ichthyological matters. His 'Manual of the Vertebrates of North America' is a cyclopedic work and is found in every naturalist's library, where it is an every day helper.

The 'Leland Stanford, Jr., University' as its full title runs, is located at Palo Alto, about thirty miles from San Francisco, in the loveliest section of the Santa Clara valley. The buildings now completed and ready for occupancy, are among the most noble structures on the continent, and are a lasting monument to the loved son and a phlianthropist's generosity. *F. W. Goding.*

THROUGH SAN GORGONIO PASS.

(From *Pacific Rural Press* xli. 422.)

From San Bernardino, eastward to the sandy plains of the Colorado desert, there is a gradual rise until one reaches the summit at Beaumont, and from there it is one slow descent until one reaches the railway station at Salton, 250 feet below sea level. From San

Bernardino, the Southern Pacific railway traverses the San Mateo cañon, where the cultivated fields are too frequent to be very interesting to a botanist.

From Redlands, on the 9th of April, '91, I took a wood road which led off to the left, among the unsettled hills, where nature still rules supreme. The cañon and hillsides were covered with a thick growth of brush, Rhus ovata, shrub oaks and California lilacs being especially conspicuous. Castilleia foliolosa grew in clumps among the bushes, a foot or more high, and forming a brilliant display on the steep cañon sides. The floral bracts are of a bright orange—vermillion at the tips—each an inch or more long, forming a dense head, among which the shorter light greenish-yellow corollas of the flowers are entirely eclipsed.

In open places, Nemophila insignis, with its bright 'baby eyes,' grew in clusters of surpassing beauty, and lined the roadside until the eastern descent to the desert commenced. The flowers averaged nearly an inch in diameter, of a lovely cyanine blue, with a lighter or a white center. It covered the hillsides in places for acres in extent, appearing like a patch of the blue sky reflected upon the earth.

Growing on some of the steeper cañon sides were clusters of a species of Phlox, suffrutescent, two or three feet high, with a profusion of light rose-purple flowers, measuring one and one-fourth inches across. The hirsute stem and foliage rendered the plant more admirable at a distance than in the hand, but is one which would command admiration and attention anywhere, and one well worth further cultivation.

Among the annuals were Lupinus hirsutissimus, with hirsute stems and foliage, attaining a hight of three feet or more, with spikes of aster-purple flowers. In some of the open fields grew Sanicula bipinnatifida, with its dense, ball-like umbels of deep dahlia-purple flowers. This species of sanicle seems abundant in Southern California, especially on adobe lands, in grain fields, or scattered over the broad plains of the larger valleys.

Layia elegans, with a center of a cadmium-yellow color, the rays of a clear lemon yellow, tipped with white, grew abundantly on the western slope from Riverside to the summit of the pass, and for a ways down the eastern slope. At the summit another Layia without the white tips to the outer rays made its appearance, while a third species of a clear white throughout, extended from the sandy plains around Colton to the eastern or desert slope. The Layias are all elegant plants, bushy and erect in habit, with flowers two inches across and of a metallic brilliancy. Layia elegans has already become favorably known in cultivation and the other varieties must soon follow.

Orthocarpus purpurascens is a peculiarly beautiful and showy annual, a foot high, diffusely branching, erect in habit, producing

numerous dense and thick terminal oblong or cylindrical spikes of flowers. The yellowish corolla is tipped with bright lemon-yellow on the lower lobes, the upper part tipped with brilliant magenta, the whole encircled and crowned with brilliantly colored floral bracts of a rich magenta or crimson-purple.

Pœonia Brownii (P. Californica Nutt.) with its coarse 'brick-red' flowers was observed in bloom on these hills, and rattleweed (Astragalus) was also abundant. The delicate, lovely rose-purple flowers of Gilia dianthoides, growing in large patches by the roadside, commanded the admiration they invariably elicit. The popcorn flowers (Krynitzkia species), of a snowy whiteness, dotted the fields of alternate green and blue and gold.

At Beaumont, at the summit of the pass, single roots of the fragrant Viola pedunculata formed masses of foliage and flowers two feet and more across, six inches high, and bearing hundreds of the peach-scented blossoms. The color of this violet is beyond comparison, being a shade between lemon and cadmium yellow, of a metallic brilliancy, deep and clear, the backs of the petals veined or tinged a rich prune-purple. The profusion and luxuriance of this violet was here greater than I had previously noted in any other locality, and it seemed to reach its maximum growth in the cultivated fields. Other lovely annuals, noted in profusion at Beaumont, were the delicate sulphur-yellow cream cups (Platystemon Californicus), the popcorn flowers, bærias, wild hyacinth (Brodiæa capitata), Nemophila insignis, orthocarpus, violets, sanicle, Sidalcea malvœflora and last, but not least, Eschscholtzia Californica—the State floral emblem of California.

The Golden Eschscholtzia was here in the hight of its beauty. Single plants would measure one to two feet high, and over a yard across. I estimated that one of these plants would bear over 500 flowers, and each flower that I measured was fully four inches in diameter or over, some measuring five inches! This was evidently the typical form, as the large, succulent roots are perennial. The intensely brilliant coloring of the flowers, words cannot depict, and the artist has yet to correctly imitate and do justice to the coloring. It is most nearly described as of a deep orange color, and yet, a touch of crimson or scarlet exists in its composition, which makes itself felt when a large field of the flowers is seen at a distance.

Single fields of this magnificent flower, hundreds of acres in extent, were observed, which, at a distance of five or six miles, were of a uniform vermilion hue—a lake of fire amid an emerald sea. Such a sight, viewed from near and from afar, is one never to be erased from memory, but the true artistic beauty of the flower is lost beside the magnificence of such a vast display of brilliant, rich but uniform coloring.

From Beaumont to the Whitewater river is a gradual descent and one continuous garden of flowers with now and then an alter-

nate field of grain. Phacelia tanacetifolia, with its heads of pale blue or rather lavender-colored flowers, lends color to the bushes that border the roadside. Chia (Salvia carduacea) grows in profusion in the fields, and is conspicuous for its large, lavender-colored flowers. Bærias and Œnotheras, popcorn flowers, Amsinckias, Lupins, and Gilias form alternate spots of orange, lemon-yellow, blue or purple amid the green of wild oats, alfilaria, clover and grasses. Spikes of brilliant flowers of a species of Delphinium, of a rich Berlin blue, rise among the clumps of bushes, over which also the delicate Megarrhiza vine with its clusters of white flowers trail in profusion.

Last but not least among this vast garden of flowers rise the Spanish bayonets on every side, like sentinels of war, on the western margin of desolate sand, rendering due tribute to spring in clusters of waxy-white, bell-shaped flowers, that lend their sweetness to the busy bee.

Beyond stretch the iron rails, where no flowers are, and where wind and sand reign supreme. *C. R. Orcutt.*

THE DOUGLAS FIR.

(From *Garden and Forest*, iv. 205.)

The Douglas Fir, from many points of view, is one of the most interesting trees of the American forest. Its monotypic character, its probably recent development in its distinct existing form, for the record of the ages has not divulged the secrets of its ancestry, the vastness of the region it occupies, its size and value to man, its beauty and capacity of adapting itself to new surroundings, all make the Douglas Fir an important inhabitant of the forests of western America—forests remarkable for the variety, size and value of the cone-bearing trees of which they are principally composed.

The Douglas Fir is distinguished from the true Firs or Abies by its petioled leaves, which, in falling, leave oval scars, by its pendulous cones with persistent scales, and by its seeds, which are not furnished with resin vesicles. It looks, moreover, in general appearance, more like a Hemlock than a Fir; it differs from the Hemlock, however, in the absence of the permanent, persistent bases of the fallen leaves which roughen the branchlets of all Hemlock trees, and in its much larger cones, which may be always recognized by the large acutely two-lobed and long-pointed bracts extended beyond the scales. It can be readily known, too, by the flat, distinctly stalked leaves which are somewhat two-ranked by a slight twist at their base.

Where climatic conditions favor the growth of large trees, as they do in the humid region of western Washington and Oregon, or

on the middle western slopes of the northern Sierra Nevada, the Douglas Fir often rises, in the course of five or six hundred years, to the height of three hundred feet, and forms a trunk ten or twelve feet in diameter above its enlarged base. The bark, which, like that of the Hemlocks, contains a considerable amount of tannin, is thick, deeply furrowed, and dark brown or red, or sometimes gray, in certain situations. Young trees, like young Spruces and Firs, are pyramidal in form, and retain their lower branches for a considerable time, sometimes even for two or three hundred years, when the individual finds sufficient space for their lateral growth, as it does occasionally when it has stood on the margin of the forest or on the steep slopes of some mountain cañon. Usually, however, the trees stand close together, especially in those parts of the country in which, under the favoring influences of a heavy rainfall, they grow to the largest size, and then their great trunks tower upward, for a hundred feet or more, without a branch. The leaves are linear and generally obtuse, an inch or an inch and a quarter long, dark green and very abundant, covering the long, slender, graceful branchlets. The flowers of the Douglas Fir are produced from the axils of the leaves of the previous year, the males surrounded by conspicuous bud-scales, the females much shorter than their narrow bracts. The cones, which are subcylindrical, ripen the first year, and vary in length from two to four inches. The seeds are triangular, convex, and red on the upper side, flat, and nearly white on the lower side, with short wings, broad at the base and acute at the apex.

The Douglas Fir extends from latitude fifty-five north, where it is found in the coast ranges and on the interior plateau of British Columbia, southward through all the regions west of the Cascade and the Sierra Nevada Mountains to Southern California. It is abundant in the Rocky Mountains from British Columbia far into Mexico, extending eastward to their eastern slopes in Montana, Wyoming, Colorado and Texas; it is common on the Wahsatch and Uintah Mountains in Utah, but is unknown on the ranges of the great basin and on the eastern slopes of the Sierra Nevada. It is most abundant and reaches its greatest size on the low glacial plain which surrounds the shores of Puget Sound. Here the Douglas Fir can be seen in all its majesty. It is the most common tree in a forest in which trees stand so close together that the traveler can barely push his way between their mighty trunks which support far above his head a canopy so dense that the rays of the sun never pierce it. Through these dark and awful shades the most thoughtless man cannot pass without experiencing that sense of solemnity and awe with which the human mind is impressed when confronted by Nature in her grandest manifestations.

The Douglas Fir grows almost as large on some of the California mountain-slopes as on the shores of Puget Sound, and it is one of the remarkable things about this tree that it flourishes at the sea-level

and on high mountains. In California it often grows to a great size at elevations varying from 6,000 to 8,000 feet above the sea, and sometimes ascends on the Rocky Mountains of Colorado to even higher altitudes, although it is always smaller and less valuable as a timber tree in the dry interior portions of the continent than in the moist coast region.

Other trees of the Pacific forest produce more valuable wood than the Douglas Fir—the Port Orford Cedar, the Sugar Pine and the Redwood. These trees are confined to a comparatively small region, however, and the Douglas Fir, in view of the great territory over which it has spread, must be considered the most important timber-tree of western America, and of no other tree is there now standing such a body of valuable and available timber. The wood of the Douglas Fir is hard, strong and durable; it may be recognized by the numerous spirally marked wood cells which distinguish it from the wood of allied conifers. The small cells which are developed in the wood of conifers at the end of the growing season are very numerous, and form broad bands which often occupy half the width of the layers of annual growth. These bands of small cells are dark colored and conspicuous, and become hard and flinty with exposure, making the wood of this tree difficult to work except when it is freshly cut. Some trees produce light red and some yellow wood, and individuals vary to a much greater degree than those of most other trees in the time required for their sap-wood to turn into heart-wood. The yellow wood is closer-grained and is considered much more valuable than the red wood. Lumbermen recognize these two varieties and pretend to be able to distinguish the trees which produce them, an assumption which still needs demonstration. The conditions which lead to the formation by the same species of such different wood are not well understood; in the case of the Douglas Fir they are probably due to soil and elevation, and, in part at least, to the age of the individual. The wood of the Douglas Fir is known in commerce as red fir, yellow fir and Oregon pine, the last name belonging, however, more properly to the wood of the Yellow Pine (Pinus ponderosa) of western America. It furnishes the principal product of the immense saw-mills situated on Puget Sound, and is manufactured, besides, wherever forests of this tree exist; it is used for all sorts of building purposes and for construction, railway ties and fuel.

The Douglas Fir was discovered late in the last century by Archibald Menzies, Vancouver's surgeon and naturalist, on his voyage of discovery; and a few years later Lewis and Clark found it in Montana during their transcontinental journey. David Douglas rediscovered it on the Columbia river in 1825 and introduced it into England; and it is the name of this bold and enterprising botanist which has become associated with this tree, although, unhappily, it cannot bear it in the language of science. No tree is more unfortunate

in its name; and there are few instances where the application of the rules which govern botanical nomenclature has produced a more unsatisfactory result. Lambert, who first named the tree, called it Pinus taxifolia, from the fancied resemblance of the leaves to those of the Yew-tree; then Lindley, disregarding Lambert's specific name, named it Abies Douglasii in honor of its rediscoverer. Carriere, recognizing the characters which separate this tree from the true Firs, coined for his genus a bastard word, half Greek and half Japanese, and called it Pseudotsuga, a perfectly improper name, as it has little in common with Tsuga, the Japanese name for the Hemlock. Carriere retained, however, Lindley's Douglassii, calling the tree Pseudotsuga Douglasii, but as Lambert's specific name is the oldest, the Douglas Fir must be known as Pseudotsuga taxifolia, a name bad in every way, and especially bad in its failure to recognize the name of Douglas, which, more than that of any other man, should be associated with it.

The Douglas Fir has proved itself in cultivation to be an ornamental tree of great value. The largest specimen in England is already more than 110 feet high, with a stout trunk furnished with branches from ground to tip, and showing no signs of diminishing vigor or beauty. The earliest attempts at cultivating the Douglas Fir in the eastern states were not successful; the trees raised from seed, gathered in the mild and humid climate of the northwest or in England, first planted here were unable, except in exceptional positions, to support our climate for any length of time. The late Dr. Parry, however, in 1862 discovered the Douglas Fir growing on the eastern slopes of the Rocky Mountains of Colorado in a climate distinguished by the severity of the cold of winter and by the drought of summer; he sent seed to the Botanic Garden at Cambridge, and the plants raised from this seed have proved hardy in the most trying situations in New England. Some of these trees are now more than twenty feet high, and although it is too soon to speak with anything like certainty in the matter, there is reason to hope that they will grow to a large size and retain their beauty for many years.

Much attention has been given to the Douglas Fir of late years as a subject for forest-planting in Europe, although the best authorities on such matters do not yet agree as to its value for this purpose. Large experimental forest-plantations are made every year, especially in some parts of Germany, where some forest-experts believe that the Douglas Fir is to rival and finally replace the Larch in Europe as a timber-tree. It has the merit of growing with surprising rapidity and of producing a large amount of timber in a comparatively short time. Few coniferous trees grow as rapidly as the Douglas Fir, and it is not uncommon to see self-sown seedlings in Washington and Oregon producing, when they stand very close together in good soil, annual shoots twelve feet long.

A remarkable form of the Douglas Fir, distinguished by its large

cones, occurs on the San Bernardino Mountains, in California. It has been considered a variety of the typical tree, and by some botanists a second species—a view supported by the fact that no intermediate forms connecting it with the type have been found, while in the region north and south of that occupied by this large fruited tree the typical Douglas Fir abounds.

ROSA MINUTIFOLIA.

Parry's wild Mexican rose was discovered by a little party of botanists in April, 1882, on the shores of Todos Santos or All Saints bay, Baja California, about forty miles south of San Diego, though it requires a full one hundred miles of travel to reach the spot by wagon road. The little town of Ensenada lies just south of where we first encountered this species and may now be reached by steamer in a few hours' time.

Dr. C. C. Parry, who was of the party, sent specimens of the little rose to his friend, Dr. George Engelmann, who described it in the Bulletin of the Torrey botanical club (vol. ix. p. 97) under the name, Rosa minutifolia. It has been figured in *Garden and Forest*, i. 102, accompanied with a few remarks by Prof. Sereno Watson, who says:

'Our wild roses have an ill reputation among botanists for the uncertainty which often attends the determination of their species. But there are some, fortunately, about which there can be no doubt, and we have here given the figure of one which carries its distinctive characteristics obtrusively to the front, and cannot be mistaken. Not only is there no other American rose like it, but it stands alone in the genus, forming M. Crepin's section, Minutifoliæ. Its compact habit, its very small and deeply toothed leaflets, and its small, solitary flowers almost sessile upon the short branchlets, together make it a very distinct species. * * * It is a much-branched, compact shrub, armed with numerous stout, straight spines, the small leaves often fascicled, and with numerous pink or white flowers along the branches. The globular base of the calyx is covered with short bristles. Evidently the flower in its wild state cannot be commended as well suited to the florist's needs, but from its habit of growth the plant may well prove a decided ornament to the lawn and garden in our more southern States, where it would doubtless be hardy.'

This rose forms low, dense thickets, two to four feet high, on the dry hillsides and mesas from the shores of Todos Santos bay to southward of San Quintin bay, but Mr. Brandegee did not observe it much south of the latter place in his journey through the Californian peninsula, though it probably extends further southward in the region of the coast. The flowers are scarcely an inch broad, but very bright and pretty, visibly enlivening the dull brown of the mesa lands on which this rose commonly grows.

Although growing on dry, often sterile soil, this rose does not readily adapt itself to even a slight change of environment. Of a thousand roots, carefully planted in soil of a similar character in San Diego, only a few survived and none thrived.

From the seed it is more easily grown, I believe, and may well repay the attention bestowed upon it. It blooms in April and May, and from then on, during the summer, remains in aestivation, rooted in the sun-baked earth and apparently as dry. With the earliest rains it is again clothed with its tiny green leaves, ready to pay its annual tribute to Flora. *C. R. Orcutt.*

THE GUADALUPE PALM.

(From *Vick's Magazine*, xiv. 168.)

Erythea edulis is one of the most beautiful of ornamental palms, a quick grower, with large fan-shaped leaves of a dark green. It is a native of the Isle of Guadalupe, off the coast of Lower California, where it is found in almost inaccessible cañons near the sea. The fruit is jet black when ripe, nearly round and about two inches in diameter. Clusters of the fruit often weigh over forty pounds apiece. The pulp is sweet and pleasant eating, and encloses a large and extremely hard seed about the size of a marble. The wild goats on the island eat the fruit with avidity.

Occasionally men surreptitiously visit the island to kill goats for their hides, and when they run out of provisions—as they sometimes do, since the island can only be approached in good weather—goat meat and palm fruit, or wild dates, as they are called, comprise their only food. The blue palm (Erythea armata), with its beautiful silvery or glaucous white foliage, is a near relative to the Guadalupe palm, and is found in the cañons bordering the desert on the mainland. *C. R. Orcutt.*

NOTES AND NEWS.

A fund of $3,000 has been raised for a monument to Audubon.

Col. N. S. Goss, state ornithologist, of Kansas, died March 10, 1891. His chief contribution to science, 'Birds of Kansas,' was issued but a few days before his death.

The death of Edward Andre, F. E. S., the well known Hymenopterist, is announced.

Prof. Philipe Poey, the eminent Cuban naturalist, and director of the Zoological Museum in Havana, has lately died.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the Library of the West American Museum of Nature and Art will be catalogued monthly.

4067. California State Mining Bureau: Tenth Annual Report of the State Mineralogist for the year ending December 1, 1890. Wm. Irelan, Jr., State Mineralogist. 983 pp., 8vo., illustrated, accompanied by geological maps of the Iowa Hill mining district, Placer county, of the Forest Hill Divide, of the Mother Lode region, etc.

4068. Third Biennial Report of the California State Board of Forestry for the years 1889-90, 1890. From J. G. Lemmon, State Botanist to the Board. With thirty artotype illustrations of evergreens. A valuable contribution on the forest trees of the State.

4069. Annual Report of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1888. Report of the U. S. National Museum. 1890. 876 pp.

4070. *Entomological News* and Proceedings of the Entomological Section of the Academy of Natural Science of Philadelphia. 1890; 8vo., 168 pp. Annual subscription $1.00. Ten monthly numbers.

4071. *The American Geologist*, a monthly journal of geology and allied sciences. Vol. V, Minneapolis, Minn., 8vo., 398 pp. January to June, 1890.

4072. Same. Vol. VI, July to December, 1890. 406 pp. Yearly subscription, $3.50.

4073. The *American Naturalist*, a monthly journal devoted to the natural sciences in their widest sense. Vol. XXIV. 1890. 8vo., 1227 pp. $4.00 per year. Ferris Bros., publishers, Phila.

4074. Report upon United States Geographical Surveys west of the one hundredth meridian, in charge of Lieut. Geo. M. Wheeler. Vol. II.—Astronomy and Barometric Hypsometry. 1877. From J. H. Barbour.

4075. Same. Vol. VI.—Botany. From J. H. Barbour.

4076. Same. Vol. VII—Archæology. From J. H. Barbour.

4077. Same. Vol. IV.—Paleontology.

4078. History and work of the Warner observatory, Rochester, N. Y., 1883-1886. Vol. I. 8vo. 70 pp. 1887.

4079. Sur un Isaria, parasite du ver blanc, par A. Giard. Extrait des comptes rendus des seances de la Societe de Biologie (April 11, 1891). From the author.

4080. Sur la distribution geographique du Photodrilus phosphoreus Duges et la taxonomie des Lombriciens, par A. Giard. From the author.

4081. U. S. board on geographic names. Bulletin No. 2, issued May 25, 1891.

4082. Report of the secretary of agriculture, 1890.

4083. Eighth annual report of the board of control of the state agricultural experiment station at Amherst, Mass., 1890.

4084. Third annual report of the West Virginia agricultural experiment station, 1890. From Dr. C. F. Millspaugh.

4085. Special consular reports. Olive culture in the Alpes maritime, 1891.

4086. Transactions of the California state agricultural society during 1889.

4087. Annual report of the light-house board to the secretary of the treasury, for the year ending June 30, 1890.

4088. Special consular reports. Fruit culture in foreign countries. 1890. Part I.—The orange and the lemon. Part II.—The olive. Part III.—The fig. Part IV.—The vine. Part V.—Supplement. Pp. 399–937.

4089. A revision of the American species of Epilobium occurring north of Mexico. By William Trelease. From the second annual report of the Missouri Botanical Garden. Issued April 22, 1891.

4090. New species of fungi from various localities. By J. B. Ellis and B. M. Everhart. From Proc. Acad. Nat Sci. of Phil. 1891. From J. B. Ellis.

4091. New North American fungi. By J. B. Ellis and B. M. Everhart. From Proc. Acad. N. S. of Phil. 1890. From J. B. Ellis.

4092. Notes on the geology and scenery of the islands forming the southerly line of the Santa Barbara channel. By Dr. Lorenzo Gordin Yates, F. G. S. A. Extract from *Amer. Geologist*, Jan. 1890. From the author.

4093. Instances of the effects of musical sounds on animals. By Robert E. C. Stearns. Extract from *American Naturalist*, Jan. 1890 From the author.

4094. New species of Montana fungi. By J. B. Ellis and F. W. Anderson. Extract from *Bot. Gaz.* Feb. 1891. With plates vii. and x. From J. B. Ellis.

4095. A new Fomes from northern Montana. By F. W. Anderson. Extract l. c., Apr. 1891. With plate xii. From J. B. Ellis.

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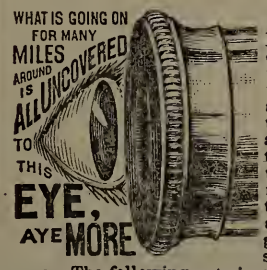

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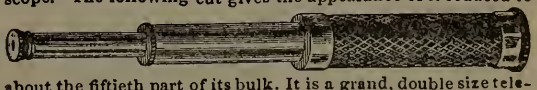

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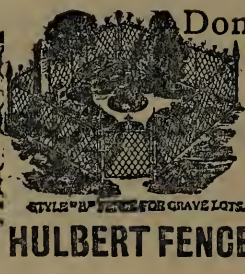

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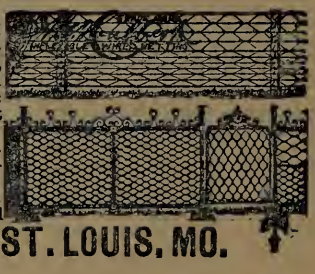

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A CACTUS CORNER IN THE MISSOURI BOTANICAL GARDEN.

The garden maintained for many years in the private grounds of the late Henry Shaw, at St. Louis, is known to most people who have passed through that city, and few people traveling for pleasure have stopped there for a day without a visit to Shaw's Garden. At the death of Henry Shaw, in 1889, this garden was left in the care of a board of trustees, to be maintained as a botanical garden, and is endowed with practically the whole of his large fortune.

The accompanying view is from the first report on the garden under the management of the trustees, and represents one of the several groups of large cacti which are set out during the summer. Many of the specimens of Opuntia and Cereus are large and old plants, and possess historical interest for students of this group of succulents, since they came originally from Prince Salm Dyck, one of the greatest authorities on the cacti, and were closely observed by Dr. Engelmann, whose studies laid the foundation for the knowledge of our own species. The collection in this group is believed to be one of the largest and most complete in existence, and the library and herbarium of the garden are also very rich in material referring to the cacti. The managers desire that every species of cactus growing in the United States, as well as Mexican species, shall be represented in the near future. For botanical study, as well as popular observation, St. Louis is likely for some time to come to be the cactus center of the country.

In Southern California, however, the cactus is more at home, and the Arizona garden at Monterey famous among travelers. A large private collection is at Pasadena, comprising about two or three hundred species, and is in thriving condition. The proprietors of the Hotel del Coronado planted about five hundred varieties, furnished by the writer, who has personally collected, or received from correspondents, more than half the varieties as yet known to botanists. Nearly twelve hundred species have been described, of which many will doubtless have to be, ultimately, referred to synonymy.

The writer has recently added nearly two hundred species to his collections, including some new and many rare ones from Mexico and other localities, and hopes ultimately to have the most complete private collection in the world. *C. R. Orcutt.*

APRIL FLOWERS IN NORTHERN CALIFORNIA.

(From *Garden and Forest*, iv. 214.)

The middle of April, in California, north of San Francisco bay, finds the wild flowers, in hundreds of species, and often in vast quantities, covering acres on acres of ground. As yet the height of

the season is not reached. The San Joaquin valley and Monterey are fully three weeks earlier, and Southern California earlier still. A month ago our common Buttercups, Ranunculus macranthus, were few in numbers; now the roadsides are yellow with them, and pastures are covered with them by the acre. In wet places R. Bloomeri takes its place with equal profusion. Yellow seems a favorite color here, and it is always seen in masses. In places a low-growing Œnothera, in profuse flower, shows the richest of yellows for a long period. Then the Eschscholtzia fairly monopolizes some vacant lots in this town where there is a deep gravelly soil. These beautiful Poppies appear, not in dozens or thousands, but turn whole acres into billowy masses of splendid orange; other acres glow with the darker orange of Amsinckia or the purple-blue of Lupines. The Eschscholtzia foliage is especially rich this season in scarlets and bronzes, which, if they could be relied upon as permanent, would make it an interesting foliage plant.

Nemophilas are largely used by nature as bedding plants here. N. insignis, Blue Eyes we call it, is everywhere in single plants or in beds, a few yards in extent, and occasionally by the solid acre. Gilia tricolor is another plant which now covers entire hillsides. Platystemon Californicus, another member of the poppy family, is also a favorite with nature. The flowers are a creamy yellow, borne separately on long stalks. In dry fields it covers large areas. White is the rarest color in these natural parks. Several species of Eritrichium are here, with delicate, white flowers. Limnanthes Douglasii, long in cultivation, forms large white masses in moist places. Scarlet does not yet appear in abundance, although Calandrinia Menziesii, another cultivated species, is everywhere.

Mendocino county and the region around the base of Mount Shasta have the richest flora in California. The Sierra Nevada range is largely volcanic. In the coast range clays prevail, with here and there volcanic projections. At Shasta these two ranges meet, giving in a small space great variations in soil, altitude, exposure and moisture. The rainiest spot in California is closely adjacent to a lava desert, so at Mount Shasta the conifers have a wonderful development in species, and the flora as a whole is very rich. In Mendocino county the redwood forest furnishes shade and moisture. The dry Chemisal region is close at hand, giving the prevalent flora of the coast range. Elevations of 5,000 to 6,000 feet give alpine conditions, while isolated volcanic points add variety to soil. Add to this narrow valleys and deep canyons, and the variety of vegetation is not to be wondered at.

Among shrubs the various Ceanothus are common, going far to

make up the unbroken growth, from six to fifteen feet high, which, in an almost impenetrable thicket, clothes many of the mountain sides of the coast range, and gives them a smooth, Heath-like appearance. The local name for this low growth is chemisal when the shrub Adenostoma fasciculatum predominates; chapparal, if the growth is largely mixed. In the aggregate vast areas are so covered. One continuous belt is sixty miles long by eight or ten wide, with very small breaks in timber or grazing land. Ceanothus divaricatus is one of the commonest elements of chapparal, and is now in bloom. In the open Redwood C. thyrsiflorus, a fine shrub, often fifteen feet high, with flowers much like a lilac, and fully as beautiful, covers large areas in an almost impenetrable thicket.

In my garden Erythronium grandiflorum is beginning to fade. It gave fine satisfaction this season, planted in chip mold, and rather shallow. E. giganteum, from Oregon, bloomed for the first time this year. The bulbs were strong and produced large blossoms, four to six to each, and several three inches across. Close observation shows some difference between this and E. grandiflorum, but the distinction is not well enough defined to be satisfactory. The yellow of the flowers of E. giganteum has a slight greenish shade, while those of E. grandiflorum shade from light straw at tips to rich yellow near the centre, and occasionally with markings from light brown to very dark. E. Smithii lacks the elegance of form of the two former, and is one-flowered. Its color, at first, is white, with a pink tinge, and becomes pink-purple. E. Howellii has a straw-colored flower with a peculiar pinkish orange centre. With me it was quite small, but the bulbs may not have been strong.

Brodiæa multiflora and B. congesta blossomed together, and very beautiful they were. They were planted in shallow boxes, the top soil mold and clay with a light dressing of sand. The first Calochortus to flower was the dainty little C. cœruleus. It was closely followed by C. lilacinus. The first is doing well in a common clay loam. Fritillaria lanceolata seems to runs to many forms, which, to the gardener, would be good varieties. The prettiest I had this year was a light yellow one. They were in shallow boxes about three inches deep, in clay loam, and shaded in the afternoon. Considering the quality of the bulb the flowers were as good as I have seen in the very best natural wild growth. There is a variety of F. recurva which is unusually fine. Some racemes were sent to me with five to nine blossoms, and I have heard of one with eighteen.

Carl Purdy.

THE GOLONDRINA PLANT.

(From the San Diego *Union*, revised by the author.)

The rattlesnake is the most abundant and the most dreaded of the venomous reptiles of the United States. The Pacific coast is free from any other variety of known poisonous serpents, but several varieties of the rattlesnake abound in sufficient numbers to make up for the lack of variety otherwise.

Our most venomous and ugly species is the black rattlesnake, (Crotalus lucifer) found near the coast, from Oregon to Lower California, smaller in size than the more common yellow rattler. It is usually found in grassy valleys or canyons, and though smaller in size is much livelier than the other form and not inclined to bear insults without showing fight.

The yellow rattler, or diamond-back, as it is sometimes called, (Crotalus enyo) is much larger, often five, more rarely six feet in length, sluggish, and not inclined to fight if it can avoid conflict, except at certain seasons when it also, is very pugnacious.

In April it is sometimes inclined to attack one, and will not readily run from you, but by June it shows a desire to escape—probably because it is blind and knows itself to be at a disadvantage. Some say it is then more dangerous, as it will strike without warning, which is probably true if it is disturbed. But the current belief that the rattlesnake will always give warning is a dangerous popular fallacy, as such is not the case. It will rattle and strike simultaneously, and often will await your near approach before giving warning. I will give a case to illustrate this point. In May, 1886, near San Quintin bay, I started to climb a steep bank to reach a certain plant growing above me. Just beside it was a large yellow rattler, coiled ready to strike and waiting for its probably expected prey. As I approached it made no motion, but the strong magnetic influence of its eye, as it wickedly watched my approach, caused me to look up just in season, when my head was nearly on a level with its own, and to step back out of danger. Still it did not rattle until a pistol shot gave it its quietus.

In June, 1889, while shaking the seed from the bush into a pan, held near the ground and under the bush, I had the pleasure of seeing a large yellow rattler quietly move from under the bush out of my way, without giving any indication of its presence beforehand. Probably my movement of the bush above it had slightly disturbed the good-natured fellow without arousing his resentment.

Another slim and exceedingly lively rattler, with alternate rings of black and white, is found in our mountains, bordering the desert.

After observing the rapid locomotion of a particularly long individual one day, I considered discretion the better part of valor when it turned upon me and showed fight, especially as I chanced to have no weapon at hand.

On the Colorado desert the rattlesnake closely imitates the color of the sand that surrounds it. The larger one resembles the diamond-back in its markings and is the species known as Crotalus pyrrhus.

The desert region possesses a smaller species (Crotalus cerastes) scarcely a foot in length, white as the sands beneath it, as pugnacious as a terrier among rats, by no means sluggish in the hot sun, but inclined to honorable warfare by giving warning to its approaching enemy. One evening the operator at a station on the Southern Pacific railway stepped into his office with slippers on his feet and quickly stepped out again as he felt and heard one of these reptiles under his foot. The sand-viper, or side-winder, as these diminutive snakes are called by their acquaintances, kept his tail employed in a lively manner until the young man put on his boots, struck a light and dispatched him. On the Mojave desert this snake is exceedingly abundant in some localities. Their nocturnal habits render them especially dangerous where they abound. All the other rattlers, I believe, travel only in the daytime as a rule, when, if one is on the lookout, he can generally avoid unpleasant experiences with them.

Dr. S. Wier Mitchell, of Philadelphia, who has made a special study of venemous serpents, and has studied our rattlesnakes especially, claims there is no sure cure known for the virus of a rattlesnake. There is a popular article in the *Century Magazine* (Vol. 38, pp. 513-514) by this author. I will copy a few sentences.

'When a man or an animal is bitten by a rattlesnake death may take place in a few minutes. It has followed in man within a minute, but unless the dose given is enormous, or by chance enters a vein, this is very unlikely. The bite is, however, popularly believed to be mortal, and therefore every case of recovery gives credit to some remedy, for it is a maxim with physicians that the incurable and easily relievable maladies are those which have the most remedies assigned to them. * * * The deadly apothecary does not succumb to his own drugs. * * * We have never been able to poison plants with snake venom. * * * It is possible to feed a pigeon on crotalus (rattlesnake) venom day after day and see it live unhurt. * * * A bite in the extremities rarely causes death.'

From the above it will be seen that the bite of the rattlesnake is

extremely dangerous but not always fatal. The poison itself has no effect on the rattlesnake, though deadly to other snakes, yet by biting itself in a vital part the snake has power to commit suicide. This has frequently been witnessed and abundantly testified to and given rise to the popular fallacy that it dies from its own poison.

Under normal conditions of health the venom is undoubtedly harmless to the human system if taken internally. Yet such experiments might prove fatal to some individuals or under unfavorable conditions of health.

We will again quote Dr. Mitchell that a clearer view of the subject may be obtained:

'If we mix any venom with a strong enough solution of potassa or soda we destroy its power to kill. A solution of iodine or perchloride has a like but a lesser capacity and so also has bromohydric acid; but by far the best of all is permanganate of potash. If this agent be injected at once or soon through a hollow needle into the fang wound wherever it touches venom it destroys it. It also acts in like destructive fashion on the tissues, but, relatively speaking, this is a small matter. If at once we can cut off the circulation by a ligature and thus delay absorption we certainly lessen the chances of death; yet, as the bites occur usually when men are far from help, it is but too often a futile aid, although it has certainly saved many lives. The first effect of venom is to lessen suddenly the pressure under which the blood is kept while in the vessels. Death from this cause must be rare, as it is active for so short a time. Any alcoholic stimulants at this period would be useful; but, despite the popular creed, it is now pretty sure that many men have been killed by the alcoholism to relieve them from the snake bite, and it is a matter of record that men dead drunk with whisky and then bitten had died of the bite. For the consequences to the blood and to the nerve centers which follow an injection of venom there is, so far as I am aware, no antidote; but as to this I do not at all despair and see clearly that our way to find relief is by competently learning what we have to do. * * * We may hope to find remedies which will stimulate and excite the vital organs which venom enfeebles. In this direction lie our hopes of future help. Anything which delays the fatal effect of the poison is also a vast advantage in treatment.'

GOLONDRINA.

Several cases of rattlesnake bites have been recently described to the writer, where five drops of ammonia taken in a glass of whisky every five minutes several times in succession resulted in relief and a cure. Ammonia and whisky, with sweet oil or any oily substance,

butter or even lard, are the most general popular remedies credited with curing the bites of venomous reptiles or insects. Other remedies, like black ash bark, caustic and bluestone, gunpowder ignited on the wound (in cases of horses or cattle bitten), and many others are often reported as efficacious in the cases where they were applied.

The Euphorbiaceæ or spurge family contains plants and shrubs, usually with a milky, acrid (poisonous) juice. In Euphorbia, the principal genus in America, the flowers are monoecious, included in a cup-shaped, four and five-lobed involucre resembling a calyx or corolla, usually bearing large and thick glands at its sinuses.

In the species to which the name golondrina is usually applied the leaves are small, all opposite and similar, furnished with awl-shaped or scaly stipules; stems and branches usually forming a broad, spreading mat on the ground; annual, usually in blossom throughout the year.

Messrs. Parke, Davis & Co., Detroit (West American Scientist, vol. vi., p. 84), say of these plants:

"We find that several species of Euphorbia, mostly the E. albomarginata and the E. prostrata, have acquired a reputation as antidotes for snake poisoning under the names of 'golondrina' and 'gollindrinera.'

In Southern California Euphorbia polycarpa is the common golondrina of the Mexicans and Indians, and has the reputation of being a sure cure for all cases of venom poisoning, in common with other similar, nearly related species of this genus. It is abundant from the seashore to the Colorado desert, where a larger variety than ours is very abundant.

The *Herald*, of Banning, Cal., Louis Munson, editor, under date of October 12, 1889, contained the following article on the varieties of this plant, which I consider worthy of reproduction:

An article of Dr. S. Wier Mitchell, of Philadelphia, lately widely copied, announced that no sure cure was known for the virus of a rattlesnake. The doctor evidently had not consulted the lore of the Indians of Southern California. Nobody hears of an Indian dying from the bite of a rattlesnake, nor of his losing any stock from that cause. On the authority of Mr. I. K. Fisher, of Santa Barbara, we state that when a snake has bitten itself it resorts to the remedy which the Indians use, from which we infer that their discovery of the cure arose from observing the snake's employment of the same remedy.

Mr. Frank Smith, of Whitewater, speaks the Indian language, and through that has come into possession of many secrets which

their reticence hides from most white men. From him we learned this remedy, and announce it with the assurance of Mr. Smith's entire responsibility and veracity. Indeed, so confident is he of the power of the remedy that he is willing, in true California eloquence, to wager Dr. Mitchell in any sum from $500 to $1000 that he can cure any case of rattlesnake bite, Dr. Mitchell himself furnishing the snake if he wants to be sure of its venomous character. The remedy is this: There is a weed which grows wherever the rattlesnake lives; it is green during snake season. When a creature is bitten the green weed is bruised in a little urine, the skin about the bite is scarified with a knife, and the bruised weed is rubbed over the scarified place for ten or fifteen minutes. A bunch of the bruised weed is then bound on the scarified surface and left. Within forty-eight hours without fail all symptoms of the poison disappear.

'The weed is a species of Euphorbia common in this country. It is a little, vinelike plant, radiating from a center, usually clinging close to the ground, with a light green round leaf shaped like a clover leaf, but only a half or a third as large. When a stem is broken, milk will drop out profusely. A few pieces of the weed grow just south of where the road leads from San Gorgonio avenue, in Banning, across the vineyard to the company's barn north of town. There just at the edge of the road along the ditch it can be found and recognized.

'Mr. Smith gave us three accounts of this cure:

'1. In 1878 a snake charmer in Prescott, Arizona, was bitten by a rattlesnake on the back of the hand. Ten hours thereafter he was unconscious, his arm and whole side swollen, and the physicians gave him up to die. Mr. Smith then applied his remedy, and the next morning the man was walking the streets well.

'2. In 1862 a Mexican boy was herding sheep in this pass for the Trujillos. He was bitten by a rattlesnake on the fiorefinger. When seen by Mr. Smith the next day he was swollen enormously all over, 'as big as three boys,' says Mr. Smith, and in great agony. This remedy cured him.

'3. A horse was bitten on the nose. When found its head was swollen, and knots as big as nuts showed down its neck and on its body. It had been bitten several hours, the fang marks showing on its nose. He cured it and rode it fifty miles the third day without injury.

'The Mexicans call this weed golondrino.

'If any one seeing this article knows Dr. S. Wier Mitchell's address, we would be obliged by having him see this article.'

In the first paragraph of the above article reference is made to

the snake using the plant itself in case of its repenting of suicidal intentions. But this is open to doubt and it may be presumed that the snake resorted to the use of the plant for some reason unknown to us. That it is an infallible cure may also be doubted, notwithstanding the numerous cases which have been described to me by different and reliable observers where it proved efficacious in preserving life. In Texas the plant is steeped in fresh milk and the tea given internally in cases where children are bitten by the rattlesnake. In Lower California the plant is first masticated and a portion of the weed then applied to the scarified wound and a part swallowed. In Mexico I am informed that among certain Indian tribes the men carry a little of this herb—dried—on their person constantly and say that where it is promptly applied a snake bite never proves fatal.

All this cumulative evidence is not to be hastily discredited in a matter of so great importance, for, while the mortality from this cause in the United States is not great, yet in India and some portions of tropical America, many thousands annually lose their lives from venomous serpents. If this plant really possesses the qualities ascribed to it its introduction in those countries afflicted in this way would be of lasting benefit to the human race.

It should be borne in mind that the milky juice of the golondrina is in itself poisonous, whether taken internally, or with many individuals, applied externally to the skin. A case of poisoning by this plant was lately brought to my attention. Several ladies and children thoughtlessly ornamented their hats with the pretty clusters of leaves and white flowers, getting the juice on to their hands and faces. In two or three of these individuals the effect was similar to a case of poisoning from the poison oak, while the others were not affected in the least. I have frequently had the milky juice on my hands, when collecting specimens for my herbarium, without any inconvenient results. *C. R. Orcutt.*

YUCCA WHIPPLEI.

(From *Vick's Magazine*, xiv, 211.)

The persistent reader of florists' catalogues will sometimes find the name that heads this article at the tail end of the short list of yuccas. It received its name from the zealous and talented Lieutenant A. W. Whipple, who, in 1853–4, crossed the plains at the head of an exploring expedition of the United States government.

In the early summer one may see the Indians of our San Bernardino valley with bundles of some green vegetable substance

which has been formed into balls of two to four inches in diameter. This substance they eat green, by chewing and extracting the sweet juice and ejecting the white fibrous 'cud' left after the operation, or, to heighten the relish, they roast it over the coals, sometimes merely warming it through. They will tell you this is mesqual (mez-kal). A botanist would tell you that it is Yucca Whipplei. What's in a name after all? Mesqual will taste just as sweet to the uninterested savage. Still earlier in the season you may see little bands of Indians on foot, and mounted on their wretched mustangs, bound for the hills; they are going after mesqual too. They will bring back with them many fibrous, spherical, sticky and dirty looking masses about as large as a cocoanut, fiber and all. If you have courage enough to taste it you will find it quite sweet, and the Indian will tell you it is mesqual, and muy dulce.

When the mesqual is suitable for cooking they gather great quantities of it, at some convenient spot near their camp. They then make a slight depression in the soil, in which a fire is built and maintained for some time, until the ground, and a quantity of stones also, which have been thrown in, become quite hot. When this primitive oven is at the right temperature the mesqual, stripped of its leaves, is thrown in, the embers having been first raked to one side. When a thick layer of mesqual has been placed in the oven, the hot stones, embers, ashes, soil and green grass are thrown over the whole pile and a fire kept burning on top of it; this is kept going till the chief cook deems the mesqual to be thoroughly cooked, when the pile is pulled to pieces and the contents allowed to cool. In taste it has a faint resemblance to a baked sweet apple, and is about of the same consistency. The whole mass is a mixture of this sweet, soft pulp and coarse, white fibers, much like a manilla rope yarn. Care must be taken not to eat much of it, for it has a medicinal effect similar to castor oil, though the Indians do not seem to mind this at all. I am told that the Indians on the desert north of us knead up the fresh-baked mesqual into cakes, and these are dried in the sun for future use. The Agave deserti is also called mesqual, and is cooked the same way, and I have good season to believe several other sorts of agave. In fact I believe that Yucca Whipplei is the only yucca that is used in this manner. Mesqual seems to be the general name for all plants that are prepared as I have stated, hence Whipple's yucca also becomes mesqual, because eatable in this manner.

Should you wander along the sand washes and slopes of the higher parts of our valley you cannot help noticing a curious looking plant growing there in considerable numbers. From an upright

spike, solid and hard, growing directly out of the ground, radiate in every direction long green leaves with sharp spikes at the ends—a hemisphere of rigid, bristling leaves. As the plant approaches maturity, and prepares to bloom, the base broadens and thickens till it has quite a bulbous appearance; when in this condition it is considered eatable by the Indians. Presently the central spike of close-clustering leaves grows taller and thicker, and from the center emerges the flower stalk, very tender and white, with the close-clustered buds so minute as to be scarcely recognizable; at this period of its growth it looks very much like a huge stalk of asparagus. The growth of this flower stalk is exceedingly rapid. The faster it grows the faster the flower buds develop, but it is not till the stalk is some five or six feet high that it begins to branch out from the central stem in every direction, and subdivides again into many smaller stems, each terminating in a perfect flower. When the plant is in full bloom there is a spike of creamy white flowers two feet across and tapering upward three or four feet to the top, where the delicate green buds are not yet open. The flowers are some two inches across, generally of a delicate cream color, or pure white, not infrequently with a line of green or purple down the center of each petal; instances are not rare where the whole flower is of a rich purple color. In texture the flower is thick and waxen looking. This yucca has the peculiarity of dying as soon as it has flowered, like the agaves. *W. F. Parish.*

[Yucca whipplei, common in Southern and Lower California, is better known among the native Californians as the ciote plant (pronounced ke-o-ty), and is also known as the mountain yucca.—Editor.]

NEW BOMBYLIDÆ FROM CALIFORNIA.

In 'Entomologica Americana' Volume I, pages 115 and 116, I gave a synoptical table of the species of Lordotus known to inhabit North America, and characterized three new species. Since the publication of that paper no new species from this region have, to my knowledge, been described. I give below descriptions of two new species which I collected in Southern California, and present a new table of all the known species of Lordotus from North America:

1. Scutellum not grooved, rounded behind..... 2
   Scutellum with a deep, longitudinal groove.....Canalis Coq.
2. Wings hyaline, destitute of brown clouds or spots..... 3
   Wings with apical half of first basal cell (usually), and basal half of marginal and of first submarginal cells brown, a brown cloud on the small crossvein and another on the crossvein at base of fourth posterior cell.....Gibbus Lw.

Wings hyaline except the brown clouds situated mostly on the crossveins.....Planus O. S.

3. Pile of breast and of legs largely white or yellowish..... 4
   Pile of face, antennæ, breast, legs and venter largely black..... .....Apicula Coq.
4. Abdomen destitute of crossbands of white tomentum..... 5
   Abdomen with distinct crossbands of white tomentum..... .....Miscellus Coq.
5. Abdomen destitute of a crossband of black pile..... 6
   Abdomen with a crossband of black pile, costa of wings in the male provided with teeth-like projections.....Zona Coq.
6. Second antennal joint scarcely longer than wide, costa of wings in the male destitute of teeth-like projections, pile of body yellowish-white in both sexes.....Junceus n. sp.
   Second antennal joint nearly twice as long as wide, costa of wings in the male provided with teeth-like projections, pile of body yellowish-white in the male, golden yellow in the female.....Diversus n. sp.

LORDOTUS JUNCEUS n. sp. Black, opaque. Front in the female densely gray pollinose, yellowish and white pilose, covered with minute black points; face in both sexes densely white pilose. First joint of antennæ scarcely two-thirds as long as the third, second joint as wide as long; pile of upper side of first two joints brownish, that on the lower side more dense and white. Pile and tomentum of upper part of occiput in the male wholly yellowish-white, in the female mixed white and yellowish-white, that on remaining part of occiput white. Thorax in the female grayish pollinose and covered with minute black points, in the male the pollen and points are almost wanting; pile and tomentum of thorax mixed white and yellowish-white, mostly of the latter color in the male. Scutellum rounded behind, its covering like that of the thorax. Pile and tomentum of pleura white, of the abdomen yellowish-white, that on the venter white; hind margins of abdominal segments two to five, sometimes yellowish in the female. Pile and tomentum of legs white, bristles of tibiæ and of tarsi black. Wings wholly hyaline, costa in the male destitute of teeth-like projections. Stalk of halteres brown and yellow, the knob sulphur-yellow. Length, 5 to 9 mm. Los Angeles and San Diego counties, California. 6 male and 3 female specimens, in May and June.

LORDOTUS DIVERSUS n. sp. Male black, opaque. Second antennal joint twice as long as wide, but a trifle shorter than the first, the two together about equaling the third in length; base of the third joint yellowish; pile of upper side of first two joints short, sparse, mixed yellow and black, of the lower side yellow, long and dense. Pile of face yellow. Pile and sparse tomentum of occiput, thorax, scutellum and abdomen wholly dirty-white, that on the pleura and

venter purer white. Scutellum rounded behind. Apex of femora, whole of tibiæ and base of tarsi, yellow; pile and tomentum of femora white, tomentum of tibiæ and tarsi yellow, their bristles black. Wings wholly hyaline, the costa beset with large, black teeth-like projections. Stalk of halteres yellowish, the knob white. Female differs from the male as follows: First two antennal joints yellow, their pile wholly golden yellow. Pile and tomentum of front, face, occiput, thorax, scutellum, abdomen, pleura and venter golden yellow. Femora wholly yellow, its pile and tomentum yellowish. Length, 6.5 to 10.5 mm., the males, on an average, the largest. San Diego county, California. 4 male and 9 female specimens, in May.

These two forms, although differing so much in coloration, are evidently the opposite sexes of the same species. I collected specimens of both forms at the same time and place, and did not take at the same time a single specimen of any other species of Lordotus having the same form of second antennal joint as both of these forms possess.

In the same volume of the periodical above referred to, on pages 221 and 222, I gave a table of the known species of Toxophora occurring in North America, and described two new species; I give below a description of another new species, which makes it necessary to somewhat modify and extend the previously published table of species, as follows:

1. Wings with three submarginal cells..... 2
   Wings with only two submarginal cells; crossvein at apex of discal cell not angular, destitute of a stump of a vein..... .....Leucopyga Wied.
2. Crossvein at apex of discal cell angular, and bearing a stump of a vein..... 3
   Crossvein at apex of discal cell not angular, destitute of a stump of a vein..... 4
3. Wings hyaline, the costal half only slightly yellowish..... .....Pellucida Coq.
   Wings smoky-brown, the costal half darker brown..... .....Amphitea Walk.
4. Abdomen with a row of black tomentose spots each side of the middle..... 5
   Abdomen with a black tomentose stripe each side of the middle.....Virgata O. S.
5. With seven spots in each of these rows.....Maxima Coq.
   With only three spots in each of these rows.....Vasta n. sp.

Toxophora vasta n. sp. Black. Tomentum of front and of face white, cheeks whitish pollinose. Tomentum of first two antennal joints white and black, the second joint densely silvery-white pollinose on the inner side in the male; third joint one and

three-fourths times as long as the second, tapering gradually to the tip, the apical portion not bristle-like. Proboscis reaches apex of second antennal joint. Pile and tomentum of occiput, thorax and scutellum yellowish-white, bristles of the two latter black. Tomentum of abdomen white, that at the base yellowish, a transverse spot of black tomentum each side of the middle on bases of the second, third and fourth segments; tomentum of venter, femora and tibiæ white, that on front side of anterior and middle femora partly black; spines of tibiæ black; hind femora in the male each with three stout black bristles on the under side near the base; tomentum of tarsi black. Wings wholly hyaline, vein at apex of discal cell evenly curved and destitute of a stump of a vein; small crossvein at last third of the discal cell. Stalk of halteres yellowish-brown, the knob sulphur-yellow. Length, 5 to 11 mm. San Diego county, California. 6 male and 11 female specimens, in May.

D. W. Coquillett.

THE THISTLE POPPIES.

(From the *American Garden*, xii. 54.)

The Papaveraceæ or Poppy family furnishes many beautiful flowers for us to cultivate and admire. The order includes near twenty genera, of which nine or ten are represented in California. Among these genera is Argemone, a genus of some six or eight species of free-flowering border plants, with large, showy, white or yellow short-pedicelled flowers. They are stout, glaucescent hardy annuals, with sinuately pinnatified, prickly-toothed leaves, from which they have become known as thistle-poppies.

Argemone grandiflora is described as 'growing two feet in height, and producing numerous large white flowers.'

Argemone Mexicana, a native of Texas and Mexico, grows to about the same height, and produces conspicuous yellow flowers in profusion. As a weed, this plant 'has spread to almost all warm countries,' but I believe it has not as yet been recorded from California. The leaves are blotched with white and less hispid than in the following species.

Argemone hispida, the chicalote or thistle poppy of Southern California, in the beauty of its flowers almost rivals the magnificent Romneya Coulteri. It forms an erect branching bush, one to three feet or more in height, producing a profusion of its large, pure white flowers, closely set among pale green, bristly-armed leaves.

The large white flowers render it very conspicuous on a lawn, by day or night, but the delicate texture of its petals, and unpleas-

antly hispid character of its stems and foliage, will not render it a favorite with florists.

When seen growing luxuriantly on its native, dry and otherwise almost barren hillsides in California, or in equally dry valleys, its beauty is not likely to be easily overlooked. It extends eastward through Colorado and New Mexico, and has gained a permanent place in the catalogues of American seedsmen.

PTELEA APTERA.

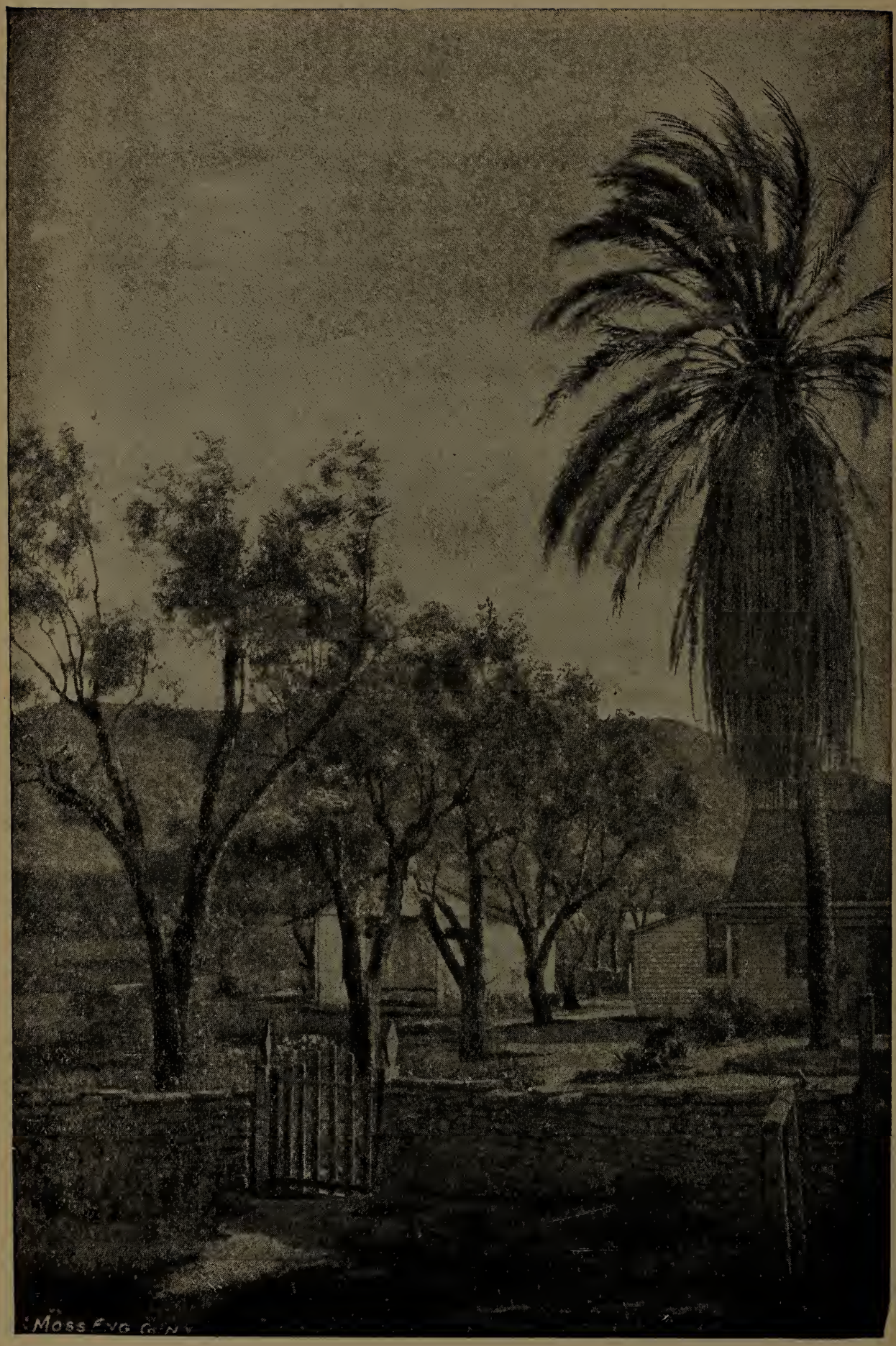
(From *Garden and Forest*, iii. 332.)

This plant, a native of Lower California, is interesting from the structure of the fruit, which differs from that of the other species of this small North American genus. In other Pteleas the indehiscent fruit is surrounded by a broad reticulate-veined wing, while in Ptelea aptera it is turgid, nut-like and glandular, and quite wingless, or with a narrow rudimentary wing only.

Ptelea aptera is a densely branched, pungently aromatic shrub, with slender stems growing to a height of five to fifteen feet and forming dense clusters. It is quite similar in habit and in general appearance to the common Ptelea angustifolia of the southern and southwestern States, and, except for the fruit, might be almost mistaken for that species.

The fruit is broadly ovate, lenticular, and slightly keeled; it is wingless or nearly so, a quarter to half an inch long, and a quarter of an inch broad; slightly emarginate at the base, tipped with the remnants of the persistent stigmas, and conspicuously glandular. It is two or rarely three-celled [more rarely four-celled]. The seeds are oblong and corrugated, with a shining black testa.

Ptelea aptera was discovered in January, 1883, on dry gravelly slopes near the shore at Punta Banda, at the southern end of Todos Santos Bay, by a party of botanists under the leadership of the late Dr. C. C. Parry. Flowers and remnants of the fruit of the preceding year were found at this time. Dr. Parry read an excellent account of the plant with diagnostic characters before the Davenport Academy of Sciences in December, 1883. This was afterward published in the proceedings of the society (iv., 39), the ripe fruit, in the meantime, having been collected by Mr. C. R. Orcutt, of San Diego. *Charles S. Sargent.*


MOSS ENG CO N Y

THE OLIVE.

The Olive tree (Olea Europea) forms the basis of one of the oldest industries in West America. The oldest olive trees planted in the United States are those at the mission of San Diego, California. These are credited with an age exceeding one hundred years and are still in good bearing condition, notwithstanding the ill-usage to which they have been subjected.

The accompanying view of these trees is of historic interest, and is taken from a report of the secretary of the California state board of horticulture. The variety planted at the old Californian missions is the one which has until late years been planted almost exclusively, and is still favorably known as the Mission olive. Other varieties have of late years been tried in Southern California with variable success. Horticultural varieties are as numerous in the olive as in the peach or apple, over a hundred named forms having been described under a perplexing nomenclature.

In the Alpes Maritimes, a province in France, we learn from a special consular report that the olive covers 70,000 acres in that province, yielding an annual income of $2,000,000—the only revenue of many families.

The olive prospers in calcareous or gravelly or dry soils where no vegetable or cereal crop could be obtained.

In Lower California the olive comes into bearing at seven years. In more northern or cooler climates, ten to twelve years is the usual time for the tree to arrive at maturity. It remains fruitful for centuries, and a tree in Europe, near Nice, was famous for its old age in 1515, and measures forty-two feet in circumference. The average yield of this tree at present is nearly 320 pounds of oil per year. A well cultivated olive tree will easily yield fifteen gallons of oil, or about 1500 gallons per acre, if planted 100 trees to the acre; but in Europe a less number is usually planted, more seldom even as many as 75 trees to the acre.

For oil the fruit is picked about a month before ripe, but for pickling for table use they are gathered when fully ripe usually.

The northern limit of the olive for fruiting is believed to be near 42° north latitude, on the Pacific coast, but it may be grown farther northward as an ornamental tree, blossoming but not maturing fruit. It is a handsome forest tree, well adapted for hillsides too sterile for scarcely anything else of value to thrive. Lands once abandoned for sterility in Africa and portions of Southern Europe are now a source of wealth, and thousands of acres of arid lands

in the west, may likewise be made to yield a revenue at no distant period sufficient for the needs of large communities.

The best varieties, culture, pickling, and manufacture of olive oil, will be the subjects of future papers. *C. R. Orcutt.*

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

SAN FRANCISCO MICROSCOPICAL SOCIETY, June 4, 1891.

The society celebrated its twenty-first anniversary at its new rooms, 432 Montgomery street, June 17, 1891. The cabinet was enriched by a quantity of diatomaceous earth, very rich in fossil diatoms, found near Lompoc, Santa Barbara county, presented by Henry G. Hanks. Henry C. Hyde presented a caterpillar from New Zealand, with a curious fungus grown from the head. The caterpillar is known by the common name of the 'bulrush caterpillar,' and to science as Sphœria Robertsia. The natives, however, call it 'aweto.' The plant, or fungus, in every case fills the body of the caterpillar, which in well-grown specimens reaches a length of three and a half inches. The fungus rises from the head and attains a length of six to ten inches. When found the body of the caterpillar is buried beneath the surface of the soil or leaf-mold, and the greater portion of the stalk as well. The apex of the plant, when in fructification, resembles the club-headed bulrush. There is every probability that the seeds or spores of the plant find a lodgment in the folds of the caterpillar's skin, where the temperature and moisture soon cause them to germinate, and the growth soon causes the death of the animal, its tissues supplying food for the plant.

William Norris presented to the society two photographs of diatoms, made by B. W. Thomas of Chicago, one a species of Eunotia from Ellensburgh, Washington, and the other a species of Asterolampra from Fisherman's Cove, California. This latter, Mr. Thomas writes, seems to be a new species, as it does not conform to the known species of that genus.

The paper of the evening was read by Harold Sidebotham, M. R. C. S., L. R. C. P., late of London, on the subject of 'Cell Division.' He alluded to the various theories held at different times by biologists on this subject, illustrating the same by drawings on the blackboard. The later and more general accepted theories were also fully exemplified. A series of carefully stained preparations showed the various stages of the animal cell, and it was remarked that his staining of the extremely delicate tissues of the infusorian, Paramecium, were worthy of more than passing notice.

Dr. Gray read a paper on the anatomy of the insect trachea, largely made up of references to the early literature of the subject.

July 1, 1891, C. W. Woodworth, of the Agricultural Experiment Station at Berkeley, was present and exhibited some slides, showing the scale insect infesting the leaves of the olive. He called attention to the fact that certain closely allied species of scale insect were invested with an outer covering produced by exuvia, or by hardening of the skin, while in the species under consideration this outer covering seemed almost entirely composed of the stellate hairs accumulated from the under side of the leaf of the olive on which it feeds. As the larva grows it insinuates itself beneath these stellate hairs, which become broken from the leaf and attached to the skin of the developing insect. Mr. Woodworth exhibited two slides last evening, one the young larval skin, of about one-fourth the adult size, and the other the complete adult form.

Henry G. Hanks was present and exhibited some curious so-called lava, recently obtained from Butte county. In November last Mr. Hanks read a paper before this society on 'Certain Magnetic Rocks,' in which he assumed that the rocks at Tucson were nearly identical with the Table Mountain capping, which overlies the deep good placers of this State, protecting them from denudation and dispersion. During a recent visit to Butte county for the study of this formation he made two important discoveries bearing on this subject, which at least afford strong evidence in favor of the opinion stated in the paper referred to, that the rocks were not of igneous, but of aqueous origin.

The first discovery was at the mouth of Chico canyon, where William Proud showed him some cylindrical natural tubes in the so-called lava, which Mr. Hanks believes to be solfataric steam pipes. These varied from the size of a quill to three inches or more, and some of them are at least four feet deep. They are not rare, but common, and it is believed may be found elsewhere. The inference drawn from this discovery is that these rocks, supposed to be igneous, are really overflows of solfataric mud; otherwise it would be impossible to account for the steam pipes, for the rock must have been at one time soft and permeable.

The second discovery was a fragment of the same rock obtained from Mrs. Caroline H. Church of the Aurora drift mine, near Magalia, in which there is a cast of a pine cone, so perfect that when liquid plaster of paris is poured in a model of a cone is obtained showing every detail of structure. Mr Hanks has examined the cast closely with the microscope, and could find no trace of charcoal. Nor can it be possible that the rock was hot, for had the cone

been burned the fine striations could not have been so perfectly preserved It is Mr. Hank's intention to study these rocks microscopically and report to the society the results of his further researches.

In view of the prominence given to the question of the discovery of the microscope, and the celebration of the three hundreth anniversary soon to take place in Antwerp, Mr. Riedy exhibited an old book by Petro Barrello, published at The Hague in 1655, entitled 'A History of the Telescope and Microscope.' This old book is remarkable as being the first published work treating of the discovery.

William E. Loy, Recording Secretary.

QUESTIONS OF NOMENCLATURE.

(From *Science*, xvii. 67.)

Professor C. S. Sargent, author of the 'Silva of North America,' says, in the first volume of that work, 'I have adopted the method which imposes upon a plant the oldest generic name applied to it by Linnæus in the first edition of the 'Genera Plantarum,' published in 1737, or by any subsequent author, and the oldest specific name used by Linnæus in the first edition of 'Species Plantarum,' published in 1753, or by any subsequent author, without regard to the fact that such a specific name may have been associated at first with a generic name improperly employed.'

To secure stability in nomenclature, it is obvious that the method adopted by Professor Sargent is the one which should universally be adopted by botanists. Other questions relating to botanical nomenclature are not so well settled as might be desired, and a few of these may be briefly stated, with the writer's present views concerning them.

The first in importance, perhaps, is the use of the names of forms at first described as varieties of other species, and later raised to specific rank, or vice versa. It would seem that the varietal name as first used should be adopted for the specific name when raised to specific rank, though many botanists have felt at liberty to rechristen them at pleasure. A varietal or subspecific name would, if this rule were followed, receive precedence over later names. Professor E. L. Greene, in 'West American Oaks,' has adopted the name Quercus Palmeri Engelm. in preference to Q. Dunnii Kell., although first published as a species under the latter name, Q. Palmeri having first been published as a subspecies by Dr. Engelmann, and later as a species. One is led to infer by Professor Greene's remarks, that, had Q. Palmeri been published as a variety instead of as a subspecies, he

would have adopted Kellogg's name for the species, though why such a distinction is made is not very evident.

Bentham, in fact, held that the earliest published name, whether applied as a specific or varietal, belonged inalienably to that individual form, whether subsequently redescribed and raised to specific, or degraded to varietal rank.

'Once a synonyme always a synonyme,' is a rule which I believe obtains among zoologists in general, and should, if tenable with them, be adopted by botanists as well. This would necessitate some important changes if adopted; and as an instance may be noted the name Washingtonia, now in use for our Californian fan palms, a synonym of Sequoia, having been unfortunately applied to our Californian giant before its application by Wendland to our palm.

If the facts permitted, some enterprising botanist might see fit to reinstate the coniferous genus, in which case the genus of palms would of necessity have to be renamed. Still, it seems like creating needless synonymy in this case to rechristen Wendland's genus, though strict adherence to the rule would render it imperative.

Uniformity in the method of citing the authors of species is another desideratum in botanical nomenclature. The most explicit custom is that adopted in general by zoologists,—the enclosing in parentheses the name of the author of the species or variety, where originally given wrong rank, or referred to a genus incorrectly. While this is often cumbersome, yet it greatly facilitates subsequent work beyond question, and is preferable to the citing of the name of the author who has referred the plant in question to a different genus, or considered it as of different rank. The existing confusion in the manner of citations renders it impossible for a writer to do strict justice to the founders of species, unless he is favored with access to large botanical libraries, and blessed with abundant leisure for consulting original descriptions. The author of the species (or variety), it seems to the writer, is the one to be cited (if the system of double citation is discarded as inconvenient) in preference to the authority for its transference from one genus to another.

Another point upon which botanists are not fully agreed is the citation of names adopted in manuscripts or herbaria, and receiving earliest publication by others than their authors. It is the custom in America (and a sensible custom it is) to cite the real author's name, even when first described and published by another author (unless published by that author as of his own authorship). Thus, Nuttall is credited with the authorship of many genera and species

first described by Torrey & Gray in the 'Synoptical Flora,' or by DeCandolle or others elsewhere.

It is now generally conceded that an author, after publishing a name, has no longer any right to substitute another name therefor in subsequent publications, even though the first name he finds to be a misnomer. This right, claimed by many of the older botanists of a past generation, is no longer contended for. It is also an open question as to how far published names may be changed or corrected by their own or subsequent authors.

A common Californian cactus is published by Prince Salm in 'Cacteæ Horto Dyckensi,' p. 91, as Mamillara Goodrichii Scheer, named in honor of Mr. Goodrich. Professor Sereno Watson informs me that Seeman says in the Botany of the '*Herald*' that it was a 'Mr. J. Goodridge, surgeon,' whom the plant was intended to commemorate in its name as its discoverer. The name, therefore, has been written M. Goodridgii by many subsequent authors. Gray (*Botanical Gazette*, ix. 53) inadvertently publishes Antirrhinum Nivenianum, and repeats this spelling on the following passage. This was collected by Rev. J. C. Nevin, and it is obviously proper to write A. Nevinianum, as the former spelling was mere inadvertence or a typographical error. But in the instance of Mamillaria Goodrichii, as originally written there is less cause for change, since the man may not have been clear in his own mind as to the correct spelling of his name,—like Shakspeare, spelling it differently at different times. *C. R. Orcutt.*

ŒNOTHERA OVATA.

(From *Garden and Forest*, iv. 285.)

There is a glowing California field flower that possesses many charms, and well deserves introduction to the garden. In its season this lovely California Œnothera, with its dwarf growth and compact clusters of golden bloom, appears as distinct and as striking a feature of the landscape as the great flame-red Eschscholtzias.

The other day—it was May 10th—I walked up the long seaward slopes of Berkeley. Every vacant lot and the very streets were golden with little plats of shining blossoms. I began to remember that for three or four months this brilliant display continues. I counted the flowers and yet unopened buds on the nearest plant. The circle of its outer leaves was about a foot in diameter; they rested upon the turf, hardly rising four inches above it at any point. Fifteen open flowers rose well above the foliage, and no less than thirty-six buds could be counted without pulling the crown

apart and descending to the microscopic sizes. Each of the four-petaled flowers was fully as large as a fifty-cent piece; one almost covered a silver dollar. The rich, clear yellow hue, and the regularity of the petals and stamens, with the golden ball of the erect pistils, formed a charming whole. *Charles Howard Shinn.*

SOME USEFUL PLANTS OF SOUTHERN CALIFORNIA.

(From *Garden and Forest*, i. 414.)

Romneya Coulteri.—Few will ask why this magnificent flower was made, after once seeing it in full bloom—for the delight of their eyes will satisfy them. The Romneya poppy is one of the most regal of our native flowers, and no flower yet introduced in our gardens excels it. Growing along the water courses on our southern border, southward to near San Quintin bay, in Lower California, it wastes its sweetness and pure white loveliness unseen and unknown, except by a few. The wax-like flowers often exceed six inches across, the white petals set off to advantage by a center of golden stamens. The stems grow from four to fifteen feet in height, rising above the surrounding brush, and when seen covering large areas and in full bloom the plant is not readily forgotten. Not content to occupy the fertile valleys, it seeks the more secluded canyons as well, and often dots the hillsides, climbing far up the mountain-sides away from the reach of any but the most enthusiastic botanists. It seems to delight in these high, sterile locations, where it is thoroughly protected from the winds and is not likely to be disturbed. In cultivation the flowers become much larger and more wax-like, and it has been in demand in Europe, where it was very early introduced. In addition to its horticultural attractions it possesses strong qualities of great medicinal value, which may secure for it a place in the materia medica when they are more fully investigated. It has long occupied a place among the medicinal herbs of the Indians of Lower California.

Simmondsia Californica.—This is a very common shrub in the southern part of the State, extending southward in the peninsula of Lower California. It was found by Dr. Veatch, on Cerros island, and was figured from that locality in one of the bulletins of the California Academy of Sciences. It forms low, oval bushes along the sea coast, often less than a foot in height when exposed to the ocean winds, and with its stiff leaves and branches and dense foliage forms impenetrable thickets in less exposed situations. The foliage is of a glaucous hue, blending harmoniously with the reddish

soil on our hills and mesas, and in sharp contrast with the dark, olive-green foliage of the common Rhus, with which it is often associated. It rarely attains a height of fifteen feet, with a trunk diameter of four or five inches. Sometimes one standing alone forms a very symmetrically shaped tree, but it usually forms an oval mass with its dense foliage. The Simmondsia, as an ornamental shrub, is likely to meet with popular favor. Growing in fertile valleys and on barren hills, along exposed sea-cliffs and on the brink of the great Colorado desert, and equally tenacious of life whether in a situation of perpetual summer or where exposed to the snows of winter, it may be presumed that it will prove both hardy and easy of cultivation. The Simmondsia is a prolific bearer of an edible nut resembling an acorn both in size and shape. The resemblance is still further increased by the persistent calyx which forms a cup for the fruit. When ripe the outer envelope splits open and liberates the nut or nuts enclosed. They have a pleasant nutty flavor, and I have frequently enjoyed eating them without any injurious effects. I am not aware that they were eaten by the Indians, but probably they formed an important article of food with them.

PRUNUS ILICIFOLIA.—The Oak-leaf cherry is one of the characteristic shrubs of San Diego county, and might, with nearly equal appropriateness, be termed the Holly-leaved cherry, as the foliage is somewhat between that of our shrub oaks and the holly. It is not rare both near the sea coast and on the higher mountains bordering the sterile Colorado basin, and some seasons it proves to be a very prolific bearer. Near the coast, I think it is oftener barren than in the interior, but it grows rather more luxuriantly in some of the sheltered and fertile canyons near the ocean. As an ornamental shrub it is highly appreciated, especially for hedges, and is extensively planted for that purpose near Los Angeles, I am informed. The glossy, dark evergreen foliage is always pleasing, and its dense, prickly character is an excellent feature. The fruit is of a dull crimson when mature, oval in shape, often rather blunt at the ends, and an inch in length. A bush loaded with the fruit is a tempting sight, but it is rather aggravating to find the pulp scarce an eighth of an inch thick. The stone forms the larger part of the fruit; but it is still worthy of notice, and finds its champions among our country people, who calmly state that they prefer it to the grape! A basketful may be quickly gathered at the proper time (September and early October) if the season has been favorable, and possibly were not other fruits so abundant it might become of use for the table. I think I have seen it stated that the experiment of grafting cultivated cherries on to this species has proved a success. If true, it

certainly is of great value for cultivation where it would be difficult to make other trees or shrubs grow successfully. Had we an agricultural experiment station in this section of the state it would be a proper subject to investigate. *C. R. Orcutt.*

NUTS OF COMMERCE.

(From the *American Agriculturist*, 1. 85.)

The Liche nut is an interesting Chinese production, probably first introduced into this country by immigrants from China, but now to be found on sale at many of our fruit stores. The nuts have a delicate russet-colored shell, more easily broken than the soft-shell almond, inclosing a rich-flavored, date-like pulp, surrounding a smooth seed with irregular depressions and about the size of a date stone; hence the name of 'Chinese dates' sometimes given these nuts. No information in regard to their cultivation is obtainable, but they could, no doubt, be raised in certain localities in this country, and probably yield profitable crops.

Some American plants seem to thrive better away from home than in their native land, and so what we have been accustomed to call the English or European walnut (Juglans regia) is now grown in the greatest perfection and over a very wide range of territory in this country. This nut flourishes and bears annual crops as far north as Narragansett Bay on the Atlantic Coast, but, like most fruits which require a long season, it reaches its greatest perfection in an equable and medium temperature, that allows of a steady, uniform growth, such as it secures on the Pacific Coast and in some of our Southern States. Under such conditions the shells are thinner, the nuts larger, smoother, and better filled than elsewhere.

As an illustration of the influence of popular taste, we may say that a variety of the English filbert, which is much larger than our native hazelnut, sells better when offered in the husks. There seems to be no good reason for it except that it is supposed to be an English custom to serve them in this form. Other varieties of the filbert and nuts in general are usually most carefully divested of their outer coverings, assorted to uniform sizes, and even polished and oiled to give them an attractive appearance.

Cashew nuts are brought from the West Indies, and may, perhaps, thrive in some of the warmer parts of the Pacific Coast. The cashew tree bears an edible fruit, from which hangs the smooth and curiously-shaped nut. The kernel or meat is very palatable, while the surrounding skin is bitter and astringent.

There is a steady but not a large demand for pistachia nuts, best

known to Americans from the beautiful green color which they impart to ices and confectionery. They are much used by oriental nations. Most of the pistachia nuts used in Europe and America are grown on the shores of the Mediterranean, and although slightly larger it is said that they are not equal in flavor to the smaller native variety brought from Persia. The nuts are covered with a delicate husk, which rubs off, and is blotched with brilliant red and purple, while the kernel is bright green. These nuts grow in clusters on small trees.

No description of the common peanut is necessary, but there are occasionally new varieties introduced worthy of some attention as, for instance, the so-called Spanish peanut, although raised in Virginia. The kernels are rounder and more delicate than those of the common variety, consequently more highly esteemed by confectioners; but the habitual 'peanut eaters' like the others best. Cuba peanuts are occasionally seen in our markets, and they are three or four times as large as the home-grown, and of a reddish color, supposed to be due to the reddish soil in which they are grown.

The so-called Chinese chestnut (Trapa) is not a chestnut at all, but the seed of an aquatic plant found in swamps and ponds. The nuts have a curious resemblance to the horns of cattle, and are of a dark brown or black color, but filled with a white, sweet meat or kernel. They are imported and sold in this country as curiosities, and not for eating. When fresh, or not too dry, they may be sprouted by placing them in a jar of water, but they have rarely been cultivated here, although it is said that they are grown in France. Street venders often have these nuts for sale, with a sprig of watercress—which somewhat resembles the true leaves—stuck into them for the purpose of deceiving purchasers.

The following named nuts are also worthy of consideration, and some of them if not all may prove to be of considerable value. The Japan chestnut is said to be as large as the Spanish, and some persons claim that it is as sweet as the American. It has not as yet appeared in our markets, although many nurserymen offer the trees for sale. They come into bearing when quite young, and the trees are said to be quite as hardy as the American chestnut.

The extensive use of nuts by cooks and caterers has given rise to a new branch of trade; that is shelled nuts, and now nearly all kinds can be bought shelled and ready for use. The shelled kernels, if kept in tight glass jars, do not deteriorate in flavor, and in some cases, as in that of the black walnut (Juglans nigra), it is claimed that they keep much longer and better than in the shells. The

white walnut or butternut is a greater favorite than the black walnut, the latter having a strong flavor not generally relished.

Salted and well-roasted almonds are now considered almost indispensable among the accessories of a well served dinner in our larger cities. Hazelnuts, walnuts, and often other kinds, are served in the same way, but the almond is the general favorite. The Texas pecan-nut is exceedingly popular, and the trade in this nut is now immense, although it was scarcely known commercially twenty years ago. The trees which produce these nuts were in years past cut down for firewood, or even to get a bag of nuts, but they are now carefully preserved, and not only the old trees cherished, but new ones planted in large numbers, and yet the demand for pecans is far ahead of the supply. The kernels or meat of the pecan is highly valued by confectioners, and in no form are they better liked than in 'plarines,' a Mexican confection made by dropping the shelled kernels into melted sugar, clean brown and unrefined, as it is found at its best on Southern plantations. An enterprising confectioner has taken out a patent for their manufacture, and is said to be doing a flourishing business.

THE STRAWBERRY GUAVA.

(From the *American Agriculturist*, I. 341.)

The Cattley Guava (Psidium Cattleyanum), better known as the strawberry guava, is rapidly gaining in popular favor throughout Florida and Southern California, and has been highly recommended for cultivation in Arizona and New Mexico. It is unquestionably the most desirable and useful of the many varieties of fruits known under the name of guava. It is a shrub or small tree that adapts itself to a dwarfish habit when grown in the house in cold climates, but in a congenial clime attains a maximum growth of fifteen to twenty feet in height, of compact form, and with dense, glossy evergreen foliage, which makes it a very ornamental tree, especially when loaded with its rich colored fruit.

It produces early, bearing fruit when less than a year old, and producing in abundance at two and three years. Every branch will be heavily loaded with the luscious ripe fruit, green fruit in various stages of growth, together with ever present clusters of fragrant flowers. The thick, dark green leaves protect the fruit partially from the sun, but at a temperature of 140° F. there is a tendency to burn. It is called hardy in England, but requires protection in the northern United States, where it is gaining in favor as an ornamental greenhouse plant. The fruit is of a dark red or purplish

ruby red color in the common variety, but a highly valued form as yet rare in cultivation has fruit of a delicate shade of yellow. The red variety will probably always be first choice with growers, however. It varies from one to two inches in diameter, is of firm texture, capable of bearing transportation well, and always meets with a ready sale, either for table use in its fresh state, or for the manufacture of delicately flavored jelly.

It can be made to produce its fruit the year round. It is a naturally heavy bearer, and the fruit may be found in the market for fully six months out of the twelve. When loaded with its tempting fruit thickly set among its glossy dark green leaves it forms a striking and beautiful object, especially if pot grown and dwarfed in habit; but to be fully appreciated it should be seen as planted out in orchards and groves in sub-tropical regions where soil and other conditions are favorable. *C. R. Orcutt.*

CAMASSIA ESCULENTA.

Quamash or Camass of the Indians is common throughout the northern Rocky Mountains and on the Pacific Coast. In the early spring the handsome violet blue flowers may be found dotted thickly over hundreds of acres of mountain meadows, resplendent in all their native beauty.

The flowers are borne on a straight stem, one or two feet high, and each of the numerous flowers is an inch or more in diameter. The narrow leaves, sent out from the large onion-like bulb in early spring, are about a foot long. The bulb is edible, and once formed an important article of food among the Indians, who would gather the bulbs just after flowering and dry them for winter use. After the bulbs are dried, by sun or fire, they are beaten into a flour or paste and more thoroughly dried for longer preservation. The plant is quite hardy, and extensively cultivated in Europe on account of its showy hyacinth-like spikes of flowers, which should be more familiar in American gardens.

PÆONIAS.

The genus Pæonia contains several oriental species or varieties in common cultivation for their ornamental flowers. The Pæony is a coarse perennial plant, and has two representatives on the Pacific coast.

PÆONIA BROWNII.—This species inhabits the subalpine regions of the snowy mountains, from middle California northward through Oregon and Washington, flowering in June and July, often near

banks of melting snow, according to Prof. Greene (*Garden and Forest*, iii, 356). Herbage glabrous and glaucous. The dull, dark red petals scarcely larger than the green sepals, thick and leathery in both species.

PÆONIA CALIFORNICA.—Restricted in its distribution (Greene, l. c.), to Southern and Lower California. 'Glabrous but not glaucous; leaves twice or thrice as large, of rounded and pedate general outline.' The northern plant I have not seen. The southern form (both are considered as belonging to one species by many botanists) is without floral beauty, though the luxuriant foliage makes it useful in some situations. Grows in dry, rocky soil, from a few hundred, to two or three thousand feet altitude, where it is subjected to a light fall of snow in winter. *C. R. Orcutt.*

NOTES AND NEWS.

A colored portrait of Lathyrus splendens appears in *Vick's Magazine* for July, 1891.

One who has had experience in the care of caged birds and gold fish writes: Never give anything greasy or salt to birds or fish. I give seeds and bread, apple and baked potato to my birds, and to the gold fish, angle worms, raw beef, baked potato and a kind of bread made of eggs and flour, without salt, the same that is best for birds.

The poisoning of plants having proved ineffectual has been entirely abandoned at the Gray herbarium. The tightness of cases and the handling of sheets are relied upon to preserve the specimens. Any which become infested may be treated to a stay in CS_2 vapor, or some other insecticide.—*Botanical Gazette.*

Meehan's Monthly, conducted by the veteran horticulturist, Thomas Meehan, contains in its first issue a handsome colored sketch of Rhododendron maximum.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the library of the West American Museum of Nature and Art will be catalogued monthly.

4096. Taxidermy and Zoological Collecting. A complete handbook for the amateur taxidermist, collector, osteologist, museum builder, sportsman, and traveller. By Wm. T. Hornaday. With chapters on collecting and preserving insects, by W. J. Holland.

Illustrated by C. B. Hudson and other artists. New York: Charles Scribner's sons. 1891. 362 octavo pages. Price, $2.50 net

A book that will be especially useful to an amateur, and one worthy of a place in every working naturalists' library.

4097. Report upon United States Geographical Surveys west of the one hundredth meridian, in charge of Capt. Geo. M. Wheeler,. Vol. I. Geographical report. 1889. From the Chief of Engineers' U. S. A.

4098. The Natural history of folk-lore. By Otis T. Mason. From the Jour of Am. Folk-Lore, iv. 97-105. From the author.

4099. A provisional host-index of the fungi of the United States. By W. G. Farlow, and A. B. Seymour. Part III. June, 1891. From the authors.

4100. New California fishes. By Mrs. R. S. Eigenmann. Extract *Amer. Naturalist*, February, 1891. From the author.

A new genus (Perkinsia), and several species are described.

4101. Subalpine mollusca of the Sierra Nevada. By W. J. Raymond. Additional notes and descriptions of new species. By J. G. Cooper. Extract Proc. Cal. Acad. II. iii. 61-91. From Dr. Cooper.

4102. Fresh water mollusca of San Francisco county. By. J. G. Cooper. Reprint from Zoe, i, 196-97. From the author.

4103. Agricultural experiment Station, Auburn, Alabama. Bulletin No. 25 (new series): Effects on butter by feeding cotton seed and cotton seed meal.

4104. Same. No. 26. Commercial fertilizers.

4105. Same. No. 27. Black rust of cotton.

4106. Agricultural experiment station, Cornell University, Ithaca, N. Y. Bulletin No. 1. Experimental dairy house.

4107. Same, No. 3: The insectary; on preventing the ravages of wire worms; on the destruction of the plum curculio by poisons.

4108. Same, No. 6: On the determination of hygroscopic water in air-dried fodders; the determination of nitrogen by the azotometic treatment of the solution resulting from the Kjeldahl digestion; fodders and feeding stuffs.

4109. Same, No. 12: A new apparatus for drying substances in hydrogen and for the extraction of fat.

4110. Same, No. 13: On the deterioration of farmyard manure by leaching and fermentation; on the effect of a grain ration for cows at pasture.

4111. Same, No. 27; The production and care of farmyard manures.

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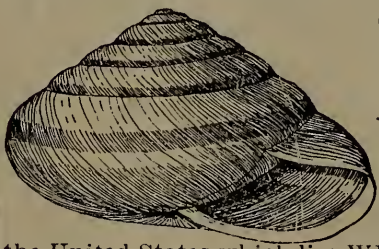

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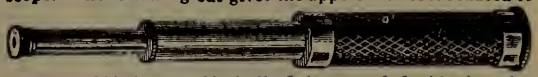

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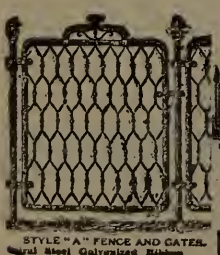

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VOLUME VII. SEPTEMBER, 1891. WHOLE No. 60.

THE

West American Scientist.

A popular monthly review and record for the Pacific Coast.

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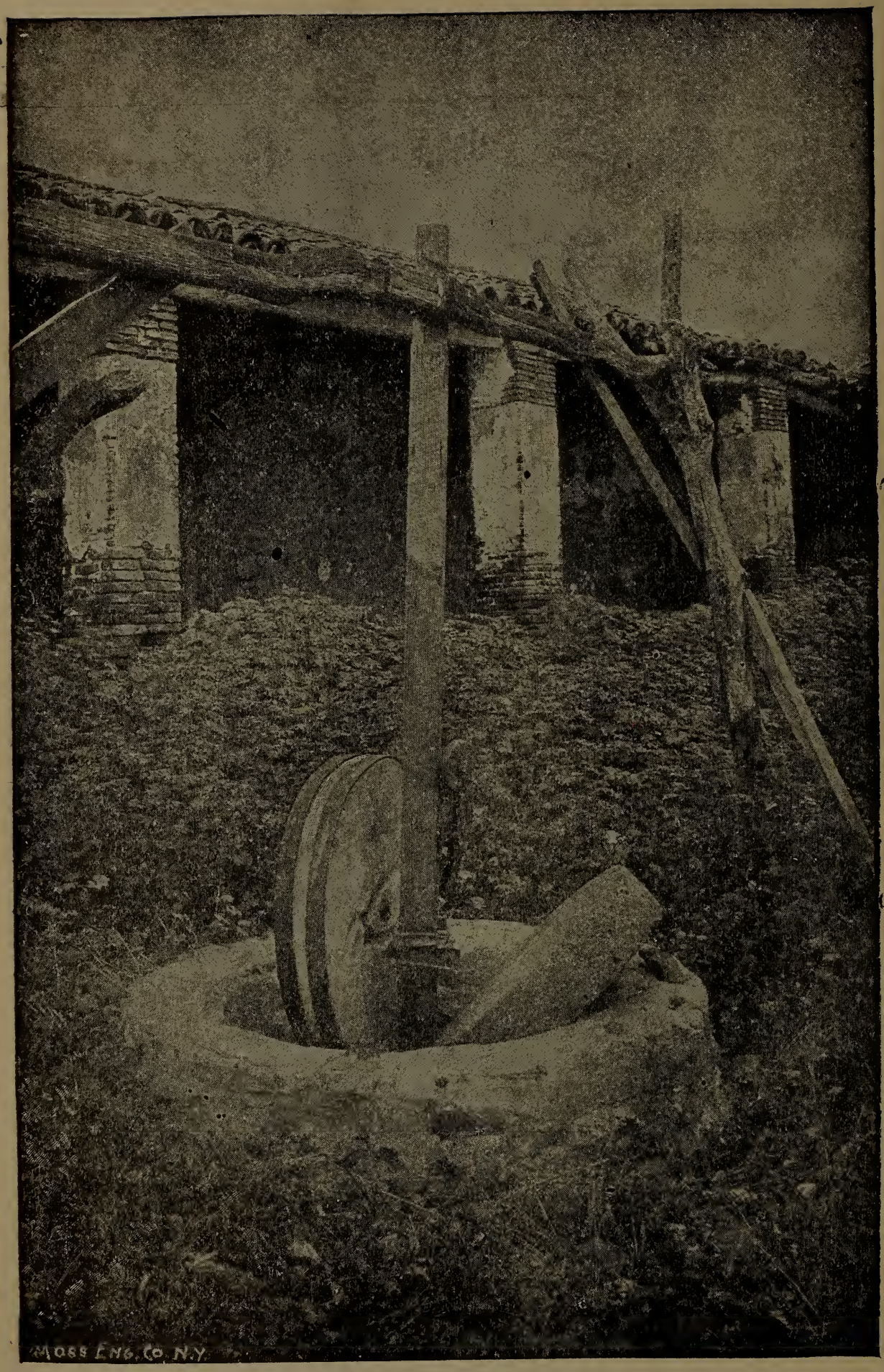

First Olive Oil Mill in California.

NEW BOMBYLIDÆ OF THE GROUP PARACOSMUS.

Among the Bombylidæ having a short proboscis is a small group of insects in which the body is elongated and nearly naked, being entirely destitute of flattened scales and of stout bristles, while the hair is so very short and sparse as to be scarcely discernible with the naked eye. To this group belongs our only described genus, Paracosmus Loew, containing two described species, Edwardsii Loew, and Morrisoni Osten Sacken. I have collected three other species belonging to this group. One of these, to which I apply the generic term Amphicosmus, differs from all the others in having three, instead of only two submarginal cells in each wing; the structure of the antennæ and the course of the second vein of the wings are the same as in Paracosmus. Another species differs from Paracosmus in the structure of the antennæ, in the course of the second vein, and in that the ocellar tubercle is situated much farther forward upon the front; to this form I apply the generic term Metacosmus. This form is known to me only in the female sex. The third species agrees with Paracosmus in the course of the second vein and in the situation of the ocellar tubercle, but the tip of the third antennal joint is rounded instead of being truncated; still I am unwilling to found a new genus on so trivial a character as this, but prefer to place this species in the genus Paracosmus, at least for the present. I will now give a more extended characterization of these three new forms.

Amphicosmus n. gen. Body elongated, nearly naked, destitute of flattened scales and of stout bristles. Head subglobular, front in profile gently convex, not greatly projecting at base of antennæ; face scarcely one-fourth as long as the front, projecting farther forward than the latter, with which it forms an obtuse angle. Antennae somewhat approximate at base, about one-fourth as long as the head, first two joints subequal in length, together slightly shorter than the third; the latter tapers but slightly towards the apex which is obliquely truncated, the upper angle prolonged in a short tooth, the lower angle broadly rounded. Proboscis not projecting beyond the oral margin, labellæ well-developed; palpi slender, clavate at the tips, slightly over one-half as long as the proboscis. Eyes narrowly separated in the male, very widely separated in the female. Ocellar tubercle close to edge of occiput. Scutellum rounded behind. Abdomen much narrower than the thorax, seven-segmented in both sexes; male genitalia exposed and very large. Wings with three submarginal and four posterior cells, all of the latter open, as is also the anal cell; bifurcation of second and third veins occurs before base of discal cell; tip of second vein curving

forward and meeting the costa at right angle; costa of male destitute of small points; small crossvein beyond middle of disacl cell. Tibiæ destitute of terminal spurs, pulvilli pad-like, empodium wanting.

AMPHICOSMUS ELEGANS n. sp. Male. Black. Front (except on the vertex) and sides of face whitish pollinose and short sparse white pilose, middle of face bare, shining black; posterior half of the oral margin whitish. Antennæ wholly black, the first two joints sparse white pilose. Occiput white pollinose. Thorax short sparse white pilose, marked with two white pollinose stripes which extend from the front end to a point slightly beyond the middle; a large white-pollinose humeral spot extending to the root of each wing, and a smaller spot on the pleura above the hind coxæ. Scutellum, short sparse white pilose, destitute of pollen. Abdomen with hind margin of the first segment white, of the second segment and sides and hind margins of the third and fourth segments reddish; pile of abdomen very short, sparse, white; venter reddish in the middle, the base and apex black. Femora black, the base and apex yellowish; tibiæ yellowish, the apex black; tarsi black, the base more or less yellowish. Wings wholly hyaline. Halteres wholly white.

Female same as the male with the following exceptions: Front in the middle, and upper portion of occiput destitute of pollen; lower part of front, sides of face broadly, and entire oral margin, white, as is also the lower part of the occiput next the eyes. Thorax destitute of the two white pollinose stripes which occur in the male. Abdomen with the second, third and fourth segments wholly reddish, the hind margins of the fourth, fifth and sixth segments narrowly bordered with white, the end of the seventh segment broadly yellow. Femora largely or wholly yellowish. Length 4.5 to 7 mm. Los Angeles county, Cal. Two males and two females, in June.

I caught these specimens while they were on the wing, hovering over the ground only a few inches from it among some low herbage. At the time of capturing them I supposed that they were Syrphids belonging to the genus Baccha, to which group of insects they bear a very close superficial resemblance.

METACOSMUS n. gen. Body elongated, nearly naked, destitute of flattened scales and stout bristles. Head subglobular, front in profile gently convex, slightly projecting forward at base of antennæ; face less than one-third the length of the front, projecting forward nearly on a plane with the lower portion of the latter. Eyes very large, quite widely separated in the female. Antennæ equal in length to the face, second joint scarcely visible, third joint

over twice as long as the first, gradually tapering to the tip which is blunt and bears several minute hairs. Ocellar tubercle situated nearly midway between the upper edge of the occiput and the insertion of the antennæ. Proboscis not projecting beyond the oral margin, the labellæ very large. Tibiæ destitute of terminal spurs, pulvilli pad-like, empodium wanting. Wings with two submarginal and four posterior cells, all of them open, as is also the anal cell; tip of second vein not curving forward, meeting the costa at an acute angle; second submarginal cell nearly straight along its upper edge; bifurcation of second and third veins occurs before the proximal end of the discal cell; small crossvein beyond middle of discal cell.

METACOSMUS EXILIS n. sp. Female. Head black, anterior portion of oral margin and underside of head behind the mouth, white; front very sparse short white pilose, orbits lightly, face densely white pollinose. Antennæ black. Occiput very short sparse white pilose. Thorax and scutellum polished black, very short sparse pilose. Abdomen polished black, hind margins of segments one to five narrowly bordered with white; abdomen laterally compressed, the posterior end truncated; venter black, hind margin of each segment narrowly bordered with white. Legs yellowish brown, coxæ black, tarsi brownish at the apex. Wings wholly hyaline, small crossvein at last third of the discal cell. Halteres brown, the knobs white. Length 6 to 7 mm. Orange county, Cal. Two females, in May.

These insects I captured about six years ago, resting on the ground in the hot sunshine, but I have never succeeded in obtaining another specimen since that time, although I have repeatedly looked for them.

PARACOSMUS INSOLENS n. sp. Male. Black. Front and face densely white pollinose and very short sparse pilose; eyes widely separated. Proboscis not projecting beyond the oral margin, labellæ very large. Antennæ with first two joints subequal in length, together slightly more than one-half as long as the third, the latter compressed, broadly oblong in profile, rapidly tapering to the tip which is blunt but not distinctly truncated. Occiput bare in the middle above, elsewhere densely white pollinose. Thorax sparsely white pollinose, a stripe of white pollen above the coxæ. Scutellum with a stripe of white pollen at its base. Abdomen with hind margins of segments one to six bordered with white, becoming less extended on each sncceeding segment, sides of first segment with a cluster of white pile; in certain lights a large portion of the abdomen appears to be white pollinose; venter lightly white

pollinose. Tibiæ with the extreme base yellowish; pulvilli very large, whitish. Wings wholly hyaline, small crossvein at or slightly beyond the middle of the discal cell; tip of second vein curving forward and meeting the costa at an obtuse angle. Halteres brown, the knobs light yellow; in front of each is a dense cluster of white pile. Genitalia consisting of a globular lower piece surmounted by a narrow shield-like piece which on either side is prolonged backward into two quite long and rather broad processes truncated at their tips, the latter curving toward each other. Length 3.5 to 4.5 mm. Los Angeles and San Diego counties, Cal. Eight males, in May and June, resting upon the bare ground in the hot sunshine.

This species will be readily distinguished from the other two described species by the color of the legs, as well as by the rounded tip of the third antennal joint. *D. W. Coquillett.*

CONTRIBUTIONS TO WEST AMERICAN MOLLUSCA.—I.

In this series of papers it is intended to present in connected form stray notes on the mollusca of the Pacific Coast, with bibliographical references, and especial attention to geographical distribution. In this first contribution we have to enumerate various new species founded by my friend, Dr. R. E. C. Stearns, in a paper published in the Proceedings of the United States National Museum (xiii. 205–225), entitled 'Descriptions of new West American land, fresh-water and marine shells, with notes and comments.'

Helix (Arionta) coloradoensis Stearns, Proc. U. S. Nat. Mus. xiii. 206, pl. xv. figs. 6, 7, 8. Grand canyon of the Colorado, opposite the Kaibab plateau, at an elevation of 3,500 feet. Allied to H. remondi.

Helix (Arionta) magdalenensis Stearns, l. c. 208, pl. xv. figs. 11, 12, 13. Magdalena, Sonora, Mexico. Allied to H. rowelli.

Holospira semisculpa Stearns, l. c. 208, pl. xv. figs. 1, 4. Near San Carlos, Chihuahua, Mexico. Closely allied to, if not a variety of H. coahuilensis.

Holospira arizonensis Stearns, l. c. 208–9, pl. xv. figs. 2, 3. Dos Cabesas, Arizona.

Melania (?Goniobasis) acutifilosa Stearns, l. c. 211, pl. xv. fig. 9. Eagle Lake, California, at an altitude of 5,115 feet.

Cyclothyca Stearns, l. c. 212. New subgenus of Capulus, with C. corrugata for type.

Cyclothyca corrugata Stearns, l. c. 212, pl. xv. figs. 5, 10. From west coast of Nicaragua.

MITRA (?COSTELLARIA) NODOCANCELLATA Stearns, l. c. 213, pl. xv. fig. 14. Gulf of California.

VENERICARDIA BARBARENSIS Stearns, l. c. 214, pl. xvi. figs. 3, 4. Off Santa Barbara islands, California, in green mud at 276 fathoms depth.

VENERICARDIA BOREALIS Conrad, Am. Con., 39 (with fig.); Stearns, l. c. 215, pl. xvi. fig. 8; Gould, Inv. Mass.; Arcturus rudis Humphrey MS.; Cardita vestita Deshayes. Circumpolar.

VENERICARDIA VENTRICOSA Gould. Stearns, l. c. 216, pl. xvi. figs. 5. 6. Puget Sound.

MIODON PROLONGATUS Cpr., *Annals and Magazine of Natural History*, 3d ser., xiv. 424; Stearns, l. c. 217, pl. xvi. figs, 7, 9. Neeah bay, and Middleton island.

LUCINA ÆQUIZONATA Stearns, l. c. 220, pl. xvii. fig. 34. Off Santa Barbara islands, California, in green mud at 276 fathoms depth.

VENUS (CHIONE) EFFEMINATI Stearns, l. c. 221, pl. xvii. figs. 1, 2. Panama bay.

PERIPLOMA DISCUS Stearns, l. c. 222, pl. xvi. figs. 1, 2. San Pedro, Long Beach and vicinity, Los Angeles county, California.

PERIPLOMA ARGENTARIA Conrad, *Jour. Phila. Acad. Nat. Sciences*, vii. pt. II (1837), 238, pl. 18, fig. 8; Stearns, l. c. 223, 224. Dr. Stearns treats this as synonymous with P. PLAIUSCULA Sby.

PERIPLOMA PLANIUSCULA Sby., Proc. Zool. Soc. London, 1834, p. 87; P. argentaria Conr., l. c.; P. alta C. B. Adams; P. Centicularis Sby.; P. excurva Cpr.; P. excurvata Cpr., British Ass. report, 1856, p. 287. Synonymy as given by Stearns, l. c. 224. Pacific coast south of Point Conception.

?PERIPLOMA PAPYRACEA Cpr., Proc. Zool. soc. London, 1856, p. 229. Stearns (l. c. 224), mentions this as a West American species belonging to Carpenter's Mexican and Panamic province.

HELIX (ARIONTA) CARPENTERI Newc. variety INDIOENSIS L. G. Yates, Nautilus, iv. 63 (also p. 51); Orcutt, Nautilus, iv. 67. Indio, San Diego county, California, in the Colorado desert region. Dr. Yates bases this variety on specimens collected by Dr. Stephen Bowers. Specimens collected in the same vicinity by the writer I have referred (Orcutt, l. c.) to H. Traskii, of which I consider it to be a well marked variety. Dr. Stearns (l. c. 206) refers to H. carpenteri as a synonym of H. remondi, so that Dr. Yates' variety will have to be referred to that, or a related species.

HALIOTIS RUFESCENS Swains. Hemphill, Nautilus, iv. 59; Orcutt, l. c. 67. The geographical range is quoted as from Mendocino county to San Nicholas island, California, and Santo Tomas landing, Lower California.

CYPRAEA (LUPONIA) SPADICEA Cpr., Nautilus, iv., 54, 71. The Santa Barbara channel is given as the most northern station yet recorded for this species. Seventy-five fine living examples are reported as found in one day some 15 or 18 miles northwest of Santa Barbara. Point Concepcion, forty miles north, is suggested as possibly its northern limit. Miss Ida M. Shepard (Nautilus, July, 1890) records it from near Long Beach, Los Angeles county.

BYTHINELLA HEMPHILLI Pilsby, Nautilus, iv. 63. Near Kentucky ferry, Snake river, Washington. Allied to B. aldrichi.

C. R. Orcutt.

LATHYRUS SPLENDENS.

(From *Vick's Magazine*, xiv. 220.)

California has doubtless furnished a greater variety of lovely wild flowers and beautiful plants that have gracefully yielded to cultivation than any other State in the Union. Annually new members of her floral circle win their way into our gardens and a permanent place in our affections. One of these latest introductions, known for years among the simple mountain people of Southern California as the 'Pride of California, has become widely recognized as well worthy of the name.

This is the deep rose-red to crimson flowered perennial pea, Lathyrus splendens, named many years ago by one of the charter members of the California Academy of Sciences, Dr. Albert Kellogg, whose memory is held in reverence by those who knew his pure life. For many years after this handsome vine had received its name it was completely lost sight of by botanists, until its very existence was doubted, and in the great work on the flora of California (Watson's Botany) was treated as a synonym.

In the spring of 1882, a party of several botanists, including the late Dr. C. C. Parry, started from San Diego to explore the then little known peninsula of Lower California. Just below the line, in a rocky canyon, we discovered this magnificent flower ornamenting the evergreen bushes along the watercourse with its graceful and brilliant blossoms. Dr. Parry at once shouted, it is Kellogg's Lathyrus splendens, and such it proved to be.

Many times since have I seen it clambering over the bushes on the higher table lands of Lower California, beside some perennial stream, or bordering a dusty highway. In the mountains back of San Diego, this year (1890), it was one of the few wild flowers that had 'watched the old year out and the new year in.' It was in its

greatest splendor in April, when the bushes for miles and miles were heavily loaded with its showy blossoms; on the 15th of June I plucked evidently the last cluster of the season.

The beloved botanist, Dr. Asa Gray, had the pleasure of admiring and picking this flower in our garden, on his last visit to California. Though Dr. Parry, at the time of its rediscovery in 1882, introduced it to the attention of European horticulturists, by whom it was well received, it was not until last year that this, the loveliest vine in the west, received attention in America.

It is considered hardy, blossoming the second season from the seed, forming a strong vine, capable of covering a veranda or arbor. Dr. Parry, after seeing it covering a porch in San Diego with its luxuriant foliage and profuse blossoms, pronounced it the handsomest plant in the West. Well may it be called the pride of the two Californias—Upper and Lower—and a fit representative of two republics. *C. R. Orcutt.*

PUGET SOUND AND ALASKA.

Nearly all the shores of Puget Sound are about alike. Wooded, rolling back to the mountains, they form a setting to a rather nice scenery. The height from the water's edge to the top of the bluff varies from a few feet to a hundred. Every where you see evidences of a vast glacial drift, composed of round pebbles, boulders and sandy loam. The general color of soil is reddish yellow. On top of this grows the gigantic firs, two to three hundred feet high. At Snohomish City, Wash., there is a cut in the railroad that is lined with marine fossils, Cretaceous, I believe. There are clams, razor shells, mussels, worm cases and tubes, and a trace of coal is found, also some broad leaves resembling flags. This cut is about 200 feet above Puget Sound, and the same shells are found there today. The coal fossils at Wilkerson are known and described. Coal is found plentifully, adjacent to the sound, and iron further back. The journey to Alaska should be taken by every naturalist that can do so. Its glaciers, mountain peaks, broad rivers and other novel features should be seen. The Treadwell gold mine, well known as one of the largest and richest in quantity of ore is opened in the side of a high hill. The ore is low grade, but easily got out and pays well. The fauna of this country is very interesting and varied. Black bear have been shot from the steamers' decks, going through the Narrows. The glaciers, probably because they break off in the bay, cannot be surpassed in beauty and size. *U. L. Hertz.*

RHODODENDRON OCCIDENTALE.

This beautiful flowering shrub extends from Oregon southward throughout California, to the mountains of San Diego, but has not as yet been reported from Mexican territory. It grows from two to sometimes twelve feet high, rarely more than six feet, however, and covers the hillsides and tangled meadows of the sierras at from three to six thousand feet altitude.

In its magnificent display of flowers during June and July it defies description, surpassing the finest oleanders and azaleas in its beauty and profusion. Its masses of beautiful and fragrant flowers are showy and attractive, the hundreds of flowers, two to three inches in diameter, completely covering the bushes for weeks at a time.

The flowers are white, or commonly rose-tinged, variegated by a pale yellow band. The shrub is of easy cultivation in rich moist soil, and should receive treatment similar to our better known garden azaleas. Although deciduous, it is worthy of attention among ornamental plants on the Pacific Coast. 'Like the oleander the plant is poisonous if eaten by children or animals, but no bad effects ever result from handling it or using the flowers.'

INDIAN METHOD OF PREPARING WOOL AND COTTON.

It was my misfortune to be sick with intermittent fever, in October, 1870, at the village of Achiabampo, Sonora, on the Gulf of California. The village of Achiabampo has two distinct divisions, one inhabited by Mexicans, the other by Indians. The Indians will trade with and work for the Mexicans, but will not allow their houses to be near the habitations of Mexicans. There was but one hotel in the village, kept by a Mexican, at the edge of the Mexican part and near the Indian portion of the village.

During my convalescence I was interested in watching what transpired in the Indian quarters, and particularly in observing their method of preparing wool. The method was the same as applied to cotton by Indians on the Atlantic side of Mexico, which I had previously seen.

An Indian's blanket by day serves him as an overcoat, by night for cover, and wool is to him of great importance. He is willing to bestow much labor upon its preparation.

I am of the opinion that the method of preparation is of ancient origin, though wool was unknown to the Indian before the advent

of the Spaniard, since these same people, I was informed, clean cotton in the same manner, some growing cotton in their fields, or buying from other Indians and Mexicans.

In the preparation of wool a small hide is placed in a convenient place on the ground, with something beneath its center to raise it a few inches from the ground. The wool is, of course, previously washed and now placed in the center of the hide. The operator—a woman—takes a kneeling posture and proceeds to thrash the wool with a long, well seasoned stick, strong and slightly larger in the center than at the ends.

With each measured stroke the stick is brought low by the right hand while the left hand is brought in contact with the wool, the thumb and finger encircling the stick, which is withdrawn through the left hand, thus preventing the wool from scattering during the thrashing process. It is a slow process, but these patient people are equal to the task and the wool is brought into the same condition as if prepared by machinery.

In the preparation of cotton, the Indians have first the slow and tedious task of separating the seeds by hand, before submitting the cotton to the slow, measured strokes of the Indian lady who represents the Indian cotton gin. The steady measured stroke and the withdrawal of the stick through the left hand prevents the scattering of the lint, which one who has not seen the operation might expect.

Slow as the process is, it has for many years answered the requirements of these people, and by patient labor they are enabled to accomplish much in a single day.

To a stranger it is an interesting sight to watch these simple people prepare their wool and cotton for spinning, with only a stick, patience and long experience to bring about the desired results. *Edward Palmer.*

SEA PANSIES.

One of the most beautiful of the organisms on the Pacific Coast is the Renilla amethystina, or sea pansy, as it is very appropriately called. It is really a community of coral-like animals living in a structure somewhat of the size and shape of a pansy flower, with a short stem that further carries out the resemblance.

The color of the main structure is of a rich royal purple, while the jelly-like animals themselves are white, and peeping out from their doorway appear like stars in the firmament of the heavens.

These communities are not rare on our sandy shores, but may

only be found by accident by those who have not learned the secrets of marine life. At low tide they may be found buried in the sands, with nothing to indicate their presence but an imperfectly circular line in the smooth-washed surface of the beach that only a trained eye is likely at first to detect.

If one of these sea pansies is removed from the sand and placed in a dish of sea water, the creatures that form the community will soon manifest life, and reveal a most beautiful structure showing plainly their relationship to the coral 'insect.'

Each individual polyp in the community will be found to possess eight long fringed tentacles around a narrow disk. The numerous individuals of each community are arranged on the upper surface of a flattened cordate fleshy structure, to the lower surface of which is attached a stem like organ, useful alike as a means of locomotion and for the anchorage of the tenement house in the sand.

The sea pansy is a near ally of the sea pens and the sea fans—which latter are branched and resemble beautiful flowering shrubs or plants. The organ-pipe coral belong to the same group of polyps according to some systems of classification. A hundred years ago the corals were all thought to be plants, as they closely imitated almost all kinds of vegetation, but they are now regarded as true animals.

THE LOQUAT.

The loquat, a beautiful evergreen tree native to China and Japan, was first named by Joseph Hooker, Photinia eriobotrya. It has received other names, like P. japonica and Eriobotrya japonica, and is now generally known under the latter name, though the first has priority and there seems no good reason to give it generic rank.

It is perfectly hardy on the California coast, south of Marin county, and may be grown further north if given slight protection.

It has been incorrectly called the Japan plum, but this name has been wisely discarded by California horticulturists who unite in calling it by its proper name, loquat.

It is remarkable for its refreshing fruit, which is elongated in shape, about two inches in length, pale yellow in color, with a very peculiar flavor, 'combining that of the tamarind and pineapple, and is highly agreeable.'

The tree is easily raised from the seed or may be grafted upon its own stock or on the quince. It does not require any particular soil apparently, and at maturity will bear from twenty to thirty

pounds of fruit to the tree. The fruit is in most demand among the Chinese, but when it becomes more generally cultivated and better known it will be in demand among all classes, and will readily bring a good price.

Hitherto the loquat has been mainly planted for ornamental effect as it is a grand bush for scenic effects. The fruit begins to ripen in late spring and continues through several months. The seed forms the larger part of the fruit, and one who eats the luscious pulp only wishes there were more of it and less seed. Seedlings are very variable and a variety with a small seed might be produced and propagated from it by budding to the pecuniary profit of the originator.

The tree seems to be free from insect pests. Photinia villosa is another native Japanese fruit, edible and pleasant, but not yet sufficiently known in this country. The loquat thrives in Santa Barbara, Los Angeles and San Diego counties, in California, and will doubtless do well in Arizona and New Mexico.

THE POMEGRANATE.

One of the most familiar of the mission fruits of California, is the ruby-red fruit of Punica granatum, a shrub native to the north of Africa, and to southwestern Asia, where it extends up the sides of the Himalayas to an altitude of 6,000 feet.

Its value as a hedge plant is great, but this use is often overlooked. As an ornamental evergreen bush it ranks high, its well-known showy habit recommending it to every eye. With its rich colored flowers, and the peculiar, cooling fruit, it is welcome and allowed to flourish in all the older Mexican gardens, and the fruit may be found for sale in our larger markets, mostly being in demand among the natonalities of the south of Europe.

We believe the shrub is grown in Oregon and Washington, but only for ornament.

The bark of the pomegranate contains 32 per cent. of tannin and is used for dyeing the yellow Morocco leather, and the outer rind of the fruit is also used as a dye.

The pomegranate is perfectly at home in Arizona, where it may be found in many gardens. The fruit varies in color from nearly white (inside) to dark ruby red or wine color, the darker fruits when crushed in water making a pleasing drink, like lemonade—the lighter colored fruits not being so sour. The commoner variety in cultivation is of a bright orange color. *C. R. Orcutt.*

THE GRANADILLA.

There are several species of the Passion-flower grown in Mexico for their edible fruit, that are deserving of a trial in California.

The best known species of the granadilla is Passiflora edulis, a native of the southern part of Brazil, which has already been planted in several places in California. The flower is of medium size, whitish with a faint tinge of blue,

It is a strong-growing vine, bearing flowers and fruit almost the year through, the fruit of the size of a small hen's egg, pale purple, useful for making into jelly, when ripe the fruit has an 'acid cooling flavor.'

There are about two hundred species of Passion-flowers recognized, native to various portions of America from the southern United States to Brazil, in South America. Some of the species are exceedingly handsome vines and prized for their magnificent flowers.

One of the most commonly cultivated species of the granadilla-fruit is Passiflora quadrangularis, also a native of Brazil. One species (P. macroptera) produces an edible fruit weighing eight pounds apiece.

May-pops of the southern states is the fruit of Passiflora incarnata. The fruit of P. ligularis has been pronounced as one of the finest fruits in existence.

Many of the tropical species are natives of mountainous regions and will endure our mild temperate climates, and the strong-growing vines, with the curious and beautiful flowers are well adapted for covering various structures and may be rendered both useful and ornamental. But nowhere in the United States do they attain a greater luxuriance than on the Pacific coast. Our national colors are reproduced in the red, the white and the blue flowers of the several rival varieties. *C. R. Orcutt.*

WOMEN IN SCIENCE.

(Read before the Pacific Coast Women's Press Association.)

Women eminent in Science have received more praise for what they have done than is their due. Comparatively speaking, so few women have entered this field of knowledge that when one does accomplish somewhat she is as loudly lauded as the precocious child. But in science as everywhere else in the domain of thought women should be judged by the same standard as her brother. Her work must not be simply very well done *for a woman.*

In the limited time at my disposal today I shall confine myself almost wholly to those whom I have met or whose work more or

less closely touches my own. I shall not, therefore, be at all exhaustive. But I cannot refrain from saying a few words of Mary Somerville whom I believe to have been not only the most eminent woman in Science of her time, but of all time. Her love of science was not the outgrowth of a regard for some person whom she might assist as was the case with her contemporary, Caroline Herschel, and most women who have entered the field of science.

Indeed, love of scientific study, especially higher mathematics, led her to persevere against the wishes of her friends and the popular prejudice against the higher education of women which her first husband shared.

She did not, however, begin to publish until urged to do so by friends who wished her to contribute a volume to the Society for Diffusing Useful Knowledge. In his letter to Dr. Somerville asking if Mrs. Somerville could not be prevailed upon to write an account of Laplace's Mechanism of the Heavens, which should give to the unlearned some insight into this work, Lord Brougham paid her the high compliment of saying that it must be left undone unless Mrs. Somerville would undertake it, as there was none other capable of doing it. At the earnest solicitation of her husband she finally consented to undertake the work. Of it she herself has written: 'Thus suddenly and unexpectedly the whole course of my life was changed. I rose early and made such arrangements with regard to my children and family affairs that I had time to write afterwards; not, however, without many interruptions. A man can always command his time under the plea of business, a woman is not allowed any such excuse.' In this last expression has Mrs. Somerville shown why so few women have become eminent in science. While she was thoroughly a womanly woman devoted to her family, enjoying society and mingling freely in it, fond of the theatre and of travel, she despised the small talk of the gossip, and was one not to indulge in frittering away her time. I must also call your attention to the fact that Mrs. Somerville's second husband, himself a classical scholar and a scientist, had no ambition for himself but chose to assist his illustrious wife in revising her MSS., correcting the proofs and verifying her results—in short, to do for her what most women of ability do for their husbands.

Dr. Maria Mitchell, professor of astronomy at Vassar, has so recently been brought to the notice of everyone at her death that it is not necessary to recount her achievements.

The direct influence of woman upon the natural and physical sciences has been little felt; but indirectly women have done a great deal. First, as helpers of their masculine friends; secondly, by

popularizing science, especially in compiling books for children; and thirdly, by subscriptions in aid of science.

A very large per cent. of those pursuing biological researches have been led into these lines by a course in medicine, and it is rather rare to find a naturalist who may not claim the title of M. D. As women have not been admitted to medical colleges until during the past few years this fact may account very largely for the non-appearance of women's names in the proceedings of museums and scientific societies. It is an almost startling fact that, among the one hundred and fifty contributors to the pages of the proceedngs of the United States National Museum during the eleven years of their publication there appear the names of only three women—two on ichthyology, one on mollusca. In the publications of the British Museum I am not acquainted with the papers of any woman, and it is so with most of the scientific societies of foreign lands. The Royal Society, however, is a notable exception, and during the five years between 1882 and '87 four women have published papers on histological subjects in the Royal Society's proceedings.

Several of the western academies of science have women on their membership lists who write for the proceedings of these societies. A notable example is that of the Natural History Society of Wisconsin, which has published a number of contributions to our knowledge of the Attidæ or Jumping Spiders by Professor G. W. and Elizabeth G. Peckham. The work of Professor and Mrs. Peckham is not only descriptive, but they have carried on extensive experiments with regard to the habits of the arachnids.

To Professor and Mrs. Louis Agassiz must the credit be given for placing an entering wedge for women in science not alone for the State of Massachusetts but for the United States as well. In 1873 Professor Agassiz inaugurated a summer school of science on the island of Penikese, in Buzzard's Bay. Here 50 young students gathered, about 20 being women. A few of the young men from some of our eastern universities unused to seeing women in college, entered a protest against their presence at Penikese. Agassiz did not at all share their feeling and at once put a stop to it. Learning who the students were he announced the first morning at breakfast that the launch was then ready at the wharf and certain gentlemen, whose names he called, would leave. No entreaties on the part of both ladies and gentlemen of the school would alter Professor Agassiz's decision. Women were here admitted to the study of nature on equal terms with men.

I have been personally acquainted with six of the women who

were at this island school of Agassiz. The wife of Dr. David S. Jordan, president of the Leland Stanford Junior University, then Miss Susan Bowen was professor of zoology at Mount Holyoke at the time of her marriage. Although Mrs. Jordan's home and social duties took much of her time so that she did not carry on researches independently she was enthusiastic in aiding her husband in his scientific work. She died in November, 1886. Her chair at Mount Holyoke is filled by Professor Cornelia M. Clapp.

Mrs. Fanny Bergen since studying with Agassiz has, with her husband, written a most readable little book on The Development Theory. For the past twelve years she has been an invalid and confined to the room. Notwithstanding this serious drawback to work of any kind Mrs. Bergen has steadily published on scientific topics and her series of papers on Animal Lore which appeared in the *Popular Science Monthly* have been a contribution to science.

Prof. and Mrs. H. H. Straight spent their first days of married life at Penikese, which has been a delightful memory, as it was an inspiration for the two who were already turning to science teaching in the normal school at Oswego, New York. Prof. Straight was later at the head of the scientific department in a school of Illinois, but by exposure and overwork he brought on consumption whereupon Mrs. Straight took his place. At his death she was desirous of continuing the work to carry out the plans her husband had made; but she was appointed to a position in Japan, where, with her two little children, she now is.

Lydia W. Shattuck was the most notable teacher of botany Mt. Holyoke has had, but death has cut short her scientific career.

Susan Hallowell has been professor of botany at Wellesley College ever since her summer at Penikese.

Mrs. Zella Reid Cronyn, now living in Massachusetts, was for some time principal of the public schools of San Diego. She encouraged her pupils to form a cabinet and to study the specimens collected and helped them to found the Historical Society, since merged with the Society of Natural History. Whether most of the women who had the good fortune to be among the number instructed by Agassiz have become teachers of science I do not know. Certain it is that now, after nearly twenty years, they are not prominently known in the world of science. Indeed not one of the number has made so brilliant a reputation as have many of the men, for we count among the most distinguished scientists of America some of those who shared the teaching of him whose genial face and almost magic gift of teaching are known throughout the breadth of his adopted land.

Mrs. Louis Agassiz has contributed to scientific literature in writing jointly both with her husband and son. 'A Journey in Brazil' is very largely the work of Mrs. Agassiz, who accompanied her husband during his entire journey and kept full notes of all that occurred. 'Seaside Studies in Natural History,' a most charming book, was written by Mrs. Agassiz and Dr. Alexander Agassiz. Mrs. Agassiz has also written on natural history topics for children. Her 'Life and Letters of Louis Agassiz' may well be classed with her scientific work. It is so happily written that it is as interesting as a novel, and one lays it down with a kinder feeling for the world.

The island school so auspiciously begun by Agassiz was abandoned after the second year, as the island proved to be too inaccessible. Outgrowths of this famous school of science are the various marine laboratories of the eastern United States, chief among which is the one at Woods' Holl, Massachusetts, first opened to students in June, 1888. The present tendency in biology to investigate the life histories and to study the minute structures of plant and animal life is largely due to the influence of our Grays and Agassiz, and the opportunities afforded at these schools by the sea-shore. Among the women who have been studying at Woods' Holl during the three summers this laboratory has been open I may mention the following: Professor Cornelia M. Clapp, of Mount Holyoke College, who was also at Agassiz's Penikese laboratory, has spent every summer at Wood's Holl. She prepared her material for study during the first summer and is now writing her paper On the Lateral Line of Batrachus tau, one of the toad fishes. Miss Platt, a student at Bryn Mawr, formerly of Harvard, last summer at this laboratory was studying the development of the brain of the shark. She has gone to Germany to continue her investigations. Miss Marcella I. O'Grady, a professor at Vassar, was working on the problem of Kupfer's Vesicle. Miss Randolph is now in Germany; at Woods' Holl she was studying the embryology of Spirorbis.

Science is exacting, requiring the devotion of months and even of years to the completion of a series of observations which, sometimes, must be carried on with little or no interruption; therefore we much more often find women popularizing the results of students of science, rather than adding to the positive knowledge of the world by studies and researches of their own. So many women have written popular books on natural history, especially for children, that I shall not attempt to name them.

There is the tendency at present for women to work out for themselves problems in the physical world independently of their

brothers and husbands which is no doubt due to the training in our higher universities which young women now receive almost, or quite as fully as young men. The school for the collegiate instruction of women at Cambridge, generally known as the Harvard Annex, gives to women as full advantages in scientific study and research as to men, except in the department of cryptogamic botany. Three or four of these Harvard women, if I may so term them, are now preparing papers embodying the original research of several years—Miss Henchman and Miss Platt in the department of animal morphology, and Miss Reul in botany.

Although women, as a usual thing, have not pursued long continued researches in science, they are furthering the progress of science very largely by bequests and special funds. Indeed, I do not know but they are doing more in this way than men. Professor Goodale, of Howard, conducts a large botany class of Boston women. Some of them in their zeal contributed so largely to that department of Howard College that it was possible to push to completion the museums and laboratories of botany as otherwise would have been out of the question.

In 1881 a marine biological laboratory was established at Anisquam, Mass. This was the work of women of Boston. Afterward it was thought best to establish another at Woods' Holl, but during the winter of 1887-8 these women were instrumental in organizing a lecture course in science in aid of the laboratory. They were eminently successful, and in June, 1888, the Marine Biological Association opened the doors of the new laboratory to students. I have already given some account of the women who have studied here during the past three summers, which, like the earlier Penikese school, is open to both sexes. However, as might be expected, a larger number of men avail themselves of the unequalled advantages of the place. There have been attracted to it the most prominent biologists of America, professors and teachers of science whose reputations are already established, finding here not only unexcelled facilities for prosecuting their investigations during the summer vacation, but also the opportunity to confer with their colleagues. Thus has this work of women—the Woods Holl Biological Laboratory—been of paramount importance to science.

Mrs. Thompson, of Stamford, Conn., has created the Elizabeth Thompson Science Fund 'for the advancement and prosecution of science in its broadest sense.' The fund now amounts to $26,000. The income from this amount is annually distributed by the trustees of the fund to applicants who are making scientific investigations irrespective of the country wherein they are carried on, the

foreigner, then, having an equal chance with the American naturalist. 'This endowment is not for the benefit of any one department of science, but it is the intention to give the preference to those investigations which cannot otherwise be provided for, which have for their object the advancement of human knowledge or the benefit of mankind in general, rather than to researches directed to the solution of questions of merely local importance.' About 30 grants for specific purposes have been made from this fund to investigators in various parts of the United States, in England, Scotland, Germany, Italy and Canada. The investigations were in meteorology, chemistry, physics, medicine, psychology, paleontology, physiology, entomology, zoology, astronomy, history and cooking. Only one of these grants is for investigations by our own sex, and that one is $300.00 for experiments on cooking. *Rosa Smith Eigenmann.*

THE RAINBOW CACTUS.

(From the Rural Californian, xiv, 261.)

The Echinocereus candicans of American catalogues is certainly one of the most beautiful of the many varieties of cacti now known in cultivation. In beauty of spines and brilliancy of flowers it can scarcely be surpassed or even equalled by any known species. The plant is three or four inches in diameter and from a few inches to probably more than a foot in height. Plants in my possession are five inches high and about four inches in diameter. The plant is closely enveloped by a network of stiff spines borne on the twenty or more narrow ribs of the plant, in clusters of twenty or more. The spines range in color from an ivory whiteness to deep crimson, the colors alternating in rings around the plant and thus giving origin to its popular name of the rainbow cactus.

RAINBOW CACTUS.

It blooms profusely—a plant six inches in height often bearing a dozen flowers, and each flower measuring from three to five inches

across. The flowers are of a bright crimson, shading to white toward the center. Its culture is easy, as is the case with most cacti.

It is a native of the southeastern part of Arizona and Sonora, Mexico. The spines are said to be in individual plants at times wholly white, and again, all the spines on a plant will be of a blood red or crimson color.

The true Echinocereus candicans, Gill, is a native of the region of La Plata, South America, and when young is of a globular form like an Echinocactus, closely covered with very long spines. Our rainbow cactus has been described by Dr. Engelmann under the name of Cereus pectinatus var. (?) rigidissimus, but it seems to the writer as worthy of specific rank. The following detailed descrip-

C. PECTINATUS.

tion is subjoined: Plant ovate-cylindrical; ribs 20 to 22, slightly interrupted; areolae linear-lanceolate, crowded on the ribs, somewhat woolly when young; spines all radiating, interwoven, recurving from the bulb-like base, awl shaped, very sharp, rigid, white, yellow or red, pellucid; lateral spines long, stout, 12 to 16 in number; the lower spines short, upper ones 3 to 6, bristly, shorter, fasciculate. Flowers produced from the side of the plant beneath the summit; ovary with 50 to 60 clusters of small rigid spines; sepals forming a tube, 60 in number, the 40 inferior ones subulate, the upper 20 lanceolate-acuminati; petals under 20 in number, purple; stigmata less than 12, green; fruit ovate to globose, spiny; seeds tuberculated. From Sonora and Arizona. Differs from C.

pectinatus mainly in its larger and more robust growth, in the absence of central spines and the rigidity of the long radial spines, one fourth to one half inch long.

CEREUS PECTINATUS Engelmann.—Plant ovate-cylindrical; ribs 18 to 23; areolae lanceolate; radial spines 16 to 20, subrecurved, pectinated, tips rosy; central spines, 2 to 5, short; flowers purple with 60 to 70 clusters of 10 to 15 rigid spines on the ovary. The flowers are two to three and a half inches across and very fragrant—one flower is said to scent a whole house. The plant is of cespitose growth as shown by the illustration and one cluster will bear a large number of flowers in a single season. Single plants will often bear a dozen or fifteen flowers, and four or five may open in one day.

CEREUS CÆSPITOSUS.

VAR. ARMATUS POSEL.—Ribs 15 to 16; radiating spines 16 to 20 with a single central spine longer than the rest. This variety is described from Monterey, Mexico, and is little known. Engelmann was in doubt as to whether it was a form of this species or of C. caespitosus.

VAR. RUFISPINUS is a horticultural variety with beautiful pink spines, otherwise probably not different from the typical form.

VAR. ROBUSTUS of Sonora and Arizona is another horticultural name for the rainbow cactus, for which Engelmann's name should receive preference.

Cereus pectinatus, and C. caespitosus also, are often grafted on Cereus grandiflorus, presenting a rather curious appearance. They are much more beautiful, however, in their natural condition, and there is nothing to be gained by the grafting process except an oddity and an unnatural growth.

CEREUS CAESPITOSUS Engelmann.—A near relative to the preceding in this small but beautiful plant. One of the most profuse bloomers and in itself a perfect gem, it is not strange that the plant is a general favorite wherever introduced. It will retain vitality for a year without roots or potting. It seldom exceeds six inches in height, but when scarcely an inch high has been known to bear four large purple flowers at a time!

Plant cespitose, ovate-cylindrical; ribs 12 to 18; areolae lanceolate; radial spines 20 to 30, straight or slightly recurved, pectenated, white; central spine rarely present, when present very short. Tube of the flower purple, 80 to 100 clusters of 6 to 12; fine hair-like spines on the ovary.

VAR. MINOR Engelmann, spines short, flower small.

VAR. MAJOR Engelmann, spines long, flower large.

VAR. CASTANEUS Engelmann, spines red or chestnut color.

This species inhabits Texas and northeastern Mexico as far south as Monterey, and is now common in cultivation.

Cereus adustus, C. infispinus and C. longisetus are other red-flowered species of Cereus found in the United States, and belonging to this section of the genus. By some authors these species are placed in a separate genus, Echinocereus, but the writer prefers for the present to treat them as constituting only a sub-genus of Cereus.

C. R. Orcutt.

COMPANIONSHIP.

'He that walketh with wise *men* shall be wise, but a companion of fools shall be destroyed.' Prov. 13: 20.

'Tis said in tales of orient lands,
The very soil exhales
The dainty fragrance of the rose,
Whose bloom there never fails.

Oh, if from the unconscious clod,
Where beauty weaves its bower,
Ambrosial air shall sweetly spring,
To honor thus a flower;

How wide the power of mind oe'r mind,
And blest are they who know,
The fragrant paths where wise men walk,
And with them wiser grow.

More than in classic groves to stray,
The presence of wise friends,
Sweeter than Asian sweet waters,
The blessing that descends.'

—Mrs. E. E. Orcutt.

AN OREGON MOUSE.

Frederick W. True has recently described a new species of mouse in the Proceedings of the U. S. National Museum (xiii, 303-4), from a specimen sent by the writer to the Smithsonian Institution, to which the name Phenacomys longicaudus has been given. The following description of this interesting animal is taken from Mr. True's paper:

Size moderate, about equalling that of Hesperomys leucopus. Ears moderate, nearly concealed by the surrounding fur. Hind foot not relatively longer than in the other species of the genus. Tail long; with the hairs, equal to the body in length.

Color above nearly uniform bright rusty brown; only the tips of the hairs are of this color, the remainder being dark plumbeous. Mixed with the brown-tipped hairs are numerous longer black hairs. Under surfaces white, slightly tinged with rusty brown, especially on the abdomen. The hairs of the throat are white to the base, but elsewhere they are only tipped with light color, the lower portions being plumbeous.

The tail is dusky chocolate-brown above and below. Fore feet brown, like the upper surface of the body; toes more or less dusky. Hind feet similar, but the toes more dusky. A spot on the outside of the metatarsus lighter than the rest of the foot. A portion of the whiskers dusky, the rest whitish. Nose dusky.

Measurements. (Dry skin No. $\frac{19071}{25883}$, type).—Total length, 148^{mm}; tail, with hairs, 62^{mm}; hind foot, 20.2^{mm}; ear from behind, 4.6^{mm}.

The skull belonging to the type is badly broken, and it is only possible to give the dimensions of some of its parts.

Measurements of the skull.—Length of the crowns of the upper series of molar teeth, 5.8^{mm}; lower molars, 5.7^{mm}; length of nasal bone, 6.6^{mm}; breadth of interorbital construction, 2.8^{mm}.

The molar teeth resemble those of P. intermedius, but the lozenges are narrower, and the external re-entrant folds of enamel in the upper molars are directed less backwards and those of the lower molars less forwards than in that species. The molars are rooted. The skull is that of a youngish individual.

Regarding the habits of this mouse, I would say that it seems to be almost exclusively arboreal, having only been taken, so far as I am able to learn, in the branches of the Douglas spruce. The type specimen was sent me from Marshfield, Coos county, Ore., by a friend, L. J. Cornelius, of Siuslaw River, who had shown me a nest of this, built about 60 feet from the ground in a small clump of

leaves and twigs, on a limb some six inches in diameter and about six feet from the body of the tree. On felling the tree about a year before he had captured one, which unfortunately had not been preserved. Of course I requested him to obtain one for me if possible, with the result that last summer, while in Coos county, he secured the specimen on which the species is based.

My first discovery of this animal was in June, 1886, in the valley of Elk Head, on the head waters of Elk creek, a tributary of the South Umpqua river, and some seven miles east of Voncalla, Douglas county, while out looking for birds' nests. I saw a nest which I took to be an old bird's nest, on the upper side of a branch in a clump of twigs some thirty feet from the ground. On throwing a stick at it to ascertain its character, I was surprised to see a mouse run out of it upon a twig, where it stopped. I threw again and succeeded in dislodging the little fellow, which, on capturing, I at once recognized as something new. I kept it for some time alive, secured the nest, and soon after sent it, with measurements, to the Smithsonian Institution, but unfortunately the package was lost, and I failed to secure another until the one described by F. W. True. I have, however, found their nests down Elk creek, along the Coquelle river, in Coos county, in southern Douglas county, and also on the upper Willamette tributaries, in Lane county, and believe it will yet be found in Washington and perhaps through the whole of the northern Pacific coast.

The nest is a novelty in itself, being about the size of a robin's nest, and built after the usual manner of mice in shape, but almost exclusively of the leaves of the tree in which it lives, which are split into threads from end to end, forming very slender filaments, seldom broken, and each leaf is frequently split twice or more, making from two to four threads of each leaf. These threads are soft, dry and apparently warm, and they show much ingenuity in the general make-up of the whole nest. Rarely has a few unsplit leaves, moss and twigs on the outside of the nest been found.

For some reason which I have not been able to discover, these nests seem to be frequently changed or deserted, from the fact that we frequently find in the woods and under lone trees of this variety, on the ground, small parts and at some times almost, as it appears, the entire nest; and I know of no other animal that has been known to split the leaves of this tree, as this one certainly does.

As to the food of this animal I can only surmise, as I did not dissect the only specimen I ever saw in the flesh, nor have I any clue farther than its habits of living in trees, but think it must subsist on the fruit of the tree, which is usually in fruit more or less all the

year, especially on those isolated and much branched trees which are found away from thick timber, and in which I believe it to be most abundant.

This conclusion is further verified by the relation of the teeth in the genus Phenacomys to the genus Hesperomys, which are rooted in both genera. The latter usually prefers grain to other food, and the teeth are more adapted for masticating hard food than the Arvicolas, whose teeth are not rooted and which feed on grass. From the tracks in the snow which I have seen at different times around the foot of the trees which it inhabits, and which tracks I think were made by this animal, I judge that it does not hibernate, and that it may to some extent feed on grass; but I have not been able to trace these tracks to any distance from the tree greater than two or three yards, neither am I positive that they were made by this animal.

Any information leading to a further knowledge of this interesting creature will be thankfully received, and we will be very grateful to anyone who will be kind enough to send us specimens or measurements. Alcoholic specimens or specimens in the flesh much preferred. *Aurelius Todd.*

THE MESQUITE BEAN.

(From the *Pacific Rural Press*, June 7, 1890.)

One of the most useful and characteristic of the trees indigenous to the southern—Mexican—borders of the United States is the mesquite tree, also known vernacularly in some localities as the Cashaw, or Algeroba tree.

According to Dr. V. Havard of the United States army, this tree constitutes the principal growth of the wooded tablelands and high valleys throughout South and Southwestern Texas. It extends westward through New Mexico and Arizona to San Diego, California, and is found to the southward through Mexico, Central and South America to the southern parts of the Argentine Republic (exclusive of Patagonia).

Prosopis dulcis (Kunth) is probably the correct botanical name of our tree, though it is usually called Prosopis juliflora D. C., by American botanists. Algarobia glandulosa, Prosopis horrida, P. juliflora, P. siliquastrum and P. glandulosa are either synonyms or mere varieties, according to Bentham.

The mesquite is frequently nothing but a thorny, straggling shrub, growing in large impenetrable thickets near the coast or over the sandhills of the Colorado desert. Elsewhere in less exposed sit-

uations, it becomes a low, wide-spreading tree, 20 to 30 feet in height, with a trunk seldom over a foot in diameter, although sometimes found from two to three feet in thickness.

In the arid regions, where this tree is found in its best estate, this tree is most useful for the excessively hard, durable wood, valuable for fuel, in fencing or for other uses. Mesquite posts and rails are but slightly affected by exposure to the influences of ordinary weather. The trunk and roots as well are unsurpassed for fuel, making a hot fire, and in many sections, from California to Texas, is the most common, often the only obtainable, fuel. The wood is also useful in cabinet work, being heavy, fine-grained, and taking a fine polish, when it has the appearance of mahogany. It is richly colored, varying from purplish black in the center to a reddish brown and yellow near the bark.

The tree is also adapted for live fences; of rapid and easy growth in situations where scarcely any other tree will thrive, it can be made to form impenetrable hedges in a few years from the seed.

Baron von Mueller says: 'The variety glandulosa exudes a gum not unlike gum arabic, and this is obtained so copiously that children could earn two to three dollars a day in gathering it in Texas, latterly about 40,000 pounds being bought by druggists there.'

On the other hand, Dr. V. Havard in speaking of the mesquite tree of Texas, says: 'During the summer months the bark secretes an amber colored gum which has the taste of gum arabic, and like it makes excellent adhesive mucilage. Its solution in water is slightly acid and astringent; it is a useful and palatable drink in the diarrhœa of children. The quantity of gum secreted by each tree is not large enough to make it an important article of commerce.'

In California I have never observed the gum in any quantity. I have collected specimens of this gum that closely resembled jet in color and very hard when found—evidently caused to exude by fire.

The tree produces abundantly of its long and slender bean-like pods, with a thick and spongy mesocarp, sweetish to the taste. These pods contain from 25 to 30 per cent of grape sugar, 11 to 17 per cent of starch, 7 to 11 per cent of protein; of organic acids, pectin and other non-nitrogenous nutritive substances 14 to 24 per cent. They are also comparatively rich in potash, lime and phosphoric acid. The pods of several varieties are said to be rich in tannic acid.

Containing, as they do, more than half their weight in assimilable nutritive principles, these pods constitute a valuable article of food, and are one of the staples with many Mexicans and Indians.

The Cahuilla Indians, and also the Cocopahs of the Colorado desert region in California, gather large quantities of the pods annually, the time of harvest lasting from June into August, when the trees are frequently loaded with their golden wealth.

The squaws go out into the groves and bring back their 'hotls' (a large, coarse-mesh sack, resembling a hammock) and baskets full of the yellow pods. They then grind the pods in their stone mills or 'matates,' into a coarse meal or flour, remove the seeds and hard shells around the seeds, and then cook to suit their taste. Sometimes they boil the flour in water and make a gruel or pudding, but the larger portion of the meal goes to form large, flat cakes or loaves of bread which may be made to supply food for many months to come, and are easy for the nomadic tribes to transport.

This bread is very sweet and pleasant to the taste, with a pleasant, slightly acid and astringent, spicy flavor. A sparkling drink, called aloja, is also made from these pods. The Comanche and Apache Indians formerly used large quantities of an alcoholic drink —a weak beer—made by fermentation of the flour.

The mesquite beans (as the pods are commonly called) are relished by most herbivorous animals, and horses and cattle will eat them with avidity and thrive on them as a substitute for grain. They are likely to be more largely utilized as fodder for stock than as human food.

In this connection, it is worthy of note that the pods of the mesquite produced in the valleys near the coast are almost invariably thin and bitter instead of thick, sweet and nutritious, as are those grown in the more arid sections on the Colorado desert and eastward. Evidently a warm, dry climate is necessary to the best development of the fruit, the fogs and coast winds causing a very inferior product.

The delicate green, finely divided foliage renders this a very beautiful tree when in leaf, and it is well worthy of being extensively cultivated.

C. R. Orcutt.

THE TENT CATERPILLAR.

These common pests having been so very plentiful this year in this locality (Moosup Valley, R. I.), I resolved to make a study of them, not adding anything new, perhaps, to the cause of science, but satisfying myself as to their habits. At the usual time in early spring the webs began to show upon apple and wild cherry trees. It is said that the young caterpillars feeding upon the tender leaves eat on an average two apiece each day. At this rate it does not

take many days to make quite a showing of naked boughs. As the caterpillars grow a new skin is formed under the old one, which splits down the back and drops off. When fully grown the worm is not such an unsightly object to look upon, if one could forget what a pest it is. They are then about two inches long, the black body covered with many yellow hairs, with a white stripe along the back, and many irregular light streaks down the sides. Between these and the white stripe is a row of pale blue spots on each side of the back.

I brought in one of the spindle-shaped cocoons, which seems to be made of white silk, sprinkled with a sulphur colored powder. Having kept it for about three weeks my patience was rewarded by a sight of the full-fledged moth, which was about one and one-quarter inches across the upper wings, which were of a dark fawn color, crossed by two oblong lighter streaks edged with white. I was surprised to find such a tiny hole in the end of the cocoon; it seemed almost impossible that the moth could have escaped. It is said that soon after the adult insects appear the females begin to lay their eggs. These are in clusters of about three hundred, arranged in the form of a belt around a small twig. This is covered with a varnish-like substance which serves as a protection during winter, as the belt remains upon the twig until the following spring. The season when the branches are bare is therefore the best time to war against this pest. If the trees are carefully searched at this time these egg clusters may be easily found and destroyed.

S. E. Kennedy.

EDITORIAL.

Our frontispiece this month is an illustration of the first olive mill on the Pacific Coast. We are indebted for it to the genial secretary of the California state board of horticulture, Mr. B. M. Lelong, The mill was built at the old mission at San Diego, the oldest mission in California.

Our new dress has been very favorably commented upon, and this magazine is the first to appear in this new style of self-spacing type. In beauty of typography we can now reasonably claim no superior in the world, and none of equal excellence in this respect on the Pacific Coast. We look to our contributors to assist us in making such a statement equally true of the matter presented our readers.

The demands of the general public sustains our view that there is a field for a journal that shall maintain a high standard, reliable,

combining practical methods with scientific accuracy. It is impossible to divorce technical details from our work in this treatment, but we aim to give enough in popular style to repay the general reader. On the other hand, the specialist will find the journal indispensable from the quantity of original matter, whether it be in technical or popular language.

NOTES AND NEWS.

LUPINUS NANUS.—Of all the annual lupines, this dwarf Californian species is one of the most charming, the shade of purple-blue being particularly pleasing. When in Essex recently, I saw a large patch of it on a seed farm, and was enabled to realize what a mass of pleasing color is formed when so grown. The seed farmers sow thinly, and then take out some of the plants if they deem them to be too crowded. The individuals, having room in which to develop, form dense tufts and bloom with surprising beauty and brilliancy. But in ordinary gardens the sower of seeds of annuals seems unable in most cases to overcome the bad habit of sowing too thickly, or of understanding the necessity for some thinning out. Only let any one grow this delightful annual in good soil in an open situation and give it plenty of room, and its beauty will astonish.—*The Garden*, xl. 53.

LAYIAS.—These pretty hardy annuals were shown at Chiswick the other day in the Kew collection of cut flowers and attracted great attention. The one which in the Kew group attracted chief attention was Layia heterotricha, with flowers about the diameter of a half-crown piece, yellow eye, rich yellow ground, edged very evenly on the points of the petals with pure white. The edging is narrow and clearly defined, the ground a very beautiful shade of apricot-yellow. Out in the gardens and under a north wall there is a small bed of Layia elegans, presumably the same thing. Both are lovely annuals and should be universally grown, especially to furnish flowers for cutting. Layia glandulosa in the Kew collection has charming pure white flowers. This is a lovely little variety also and should become an immense favorite, especially for vase or espergne decoration.—*The Garden*, xl. 53.

A NEW ASTER.—Those who are interested in these beautiful fall blooming wild flowers, will find a new species illustrated and described in a recent number of the *Botanical Gazette*. It is called Aster Orcuttii, and is from the Colorado desert, in California. It

is a very handsome species, and well worth cultivating. The flowers are not borne in clusters or panicles, as in so many asters, but are singly on the ends of the stalks. The edges of the leaves are also so deeply cut as to be almost comb like, and very different in appearance to the ordinary run of the asters as we see them in the east.—*Meehans' Monthly*, i. 22.

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the library of the West American Museum of Nature and Art will be catalogued monthly.

4112. Second annual report of the Cornell University agricultural experiment station, Ithaca, N. Y. 1889. (The first annual report is wanted by the editor.)

4113. Reports on the observations of the total eclipse of the sun, December 21-22, 1889, and of the total eclipse of the moon, July 22, 1888, to which is added a catalogue of the library, published by the Lick observatory. Sacramento. 1891. 122 pp. 8vo.

4114. Proceedings of the American Forestry Association at the summer meeting held in Quebec, September 2-5, 1890, and at the ninth annual meeting, held in Washington, December 30, 1890. Washington, D.C. 1891. 111 pp., 8vo. (Copies may be obtained of Charles C. Binney, 218 South 4th street, Philadelphia, at fifty cents each.)

4115. Catalogue of the herbarium of the late Dr. Charles C. Parry, of Davenport Iowa. Printed by Mrs. E. R. Parry, Davenport, Iowa. July, 1891. 82 pp., 8vo.

The collection contains upwards of 20,000 specimens, representing over 7,000 species, and is particularly rich in West American types. The herbarium, and an extensive botanical library, are now offered for sale by Mrs. Parry, and it is greatly to be hoped that they may be secured by some Pacific coast institution, where they most properly belong.

4116. The practical working of the Inter-state commerce act. By John A. Wright. Philadelphia. 1891. 40 pp., 8vo.

4117. Catalogue of economic plants in the collection of the U. S. Department of Agriculture. By William Saunders. Washington. 1891. 42 pp., 8vo.

4118. The Chocolate-plant (Theobroma cacao) and its products. Walter Baker & Co. Dorchester, Mass. 1891. 40 pp., 8vo., with illustrations.

4119. U. S. Dept. Agriculture: Forestry Division. Bulletin No. 5. What is Forestry? By B. E. Fernow. Washington. 1891. 52 pp.

4120. U. S. Dept. Agriculture. Papers on horticultural and kindred subjects. By William Saunders. Washington. 1891. Reprinted from reports of the department of agriculture. 1863-1889.

2121. Basket-work of the North American aborigines. By Otis T. Mason. Washington. 1890. From the report of the Smithsonian Institution, 1883-'84, part ii. pp. 291-306 and plates i. to lxiv.

4122. Geological survey of Missouri. Bulletin No. 5. 1891.

4123. Illustrative cases of congenital club-foot. By H. Augustus Wilson, M. D. Reprinted from Annals of Gynæcology and Pædiatry. June, 1891. From the author.

4124. Directions for collecting birds. By Robert Ridgway.

4125. A catalogue of the fresh-water fishes of South America. By C. H. and R. S. Eigenmann.

4126. Fishes collected by William P. Seal in Chesapeake bay, at Cape Charles City, Virginia, September 16 to October 3, 1890. By Barton A. Bean.

4127. Relations of temperature to vertebrae among fishes. By David Starr Jordan.

4128. On the structure of the tongue in humming birds. By Frederic A. Lucas.

4129. Contributions to American botany. xviii. By Sereno Watson. From Proc. Amer. Acad. Arts and Sci., xxvi, 124-163. From the author.

This paper consists (1) of descriptions of some new N. A. species, chiefly of the U. S., with a revision of the American species of the genus Erythronium; (2) descriptions of new Mexican species, collected chiefly by C. G. Pringle in 1889 and 1890; (3) upon a wild species of Zea from Mexico; and (4) notes upon a collection of plants from the Island of Ascension. Liebmann's genus Llavea, of the Sapindaceæ, is named Neopringlea—worthily dedicated to the eminent Mexican explorer, C. G. Pringle.

4130. The relation of the Mexican flora to that of the United States. By Sereno Watson. From Proc. A. A. A. S., xxxix, 291-2. Abstract. From the author.

4131. Notes on North American Halorageæ. By Thomas Morong. Reprinted from Bull. Tarr. Bot. Club, xviii, 229-246. From the author.

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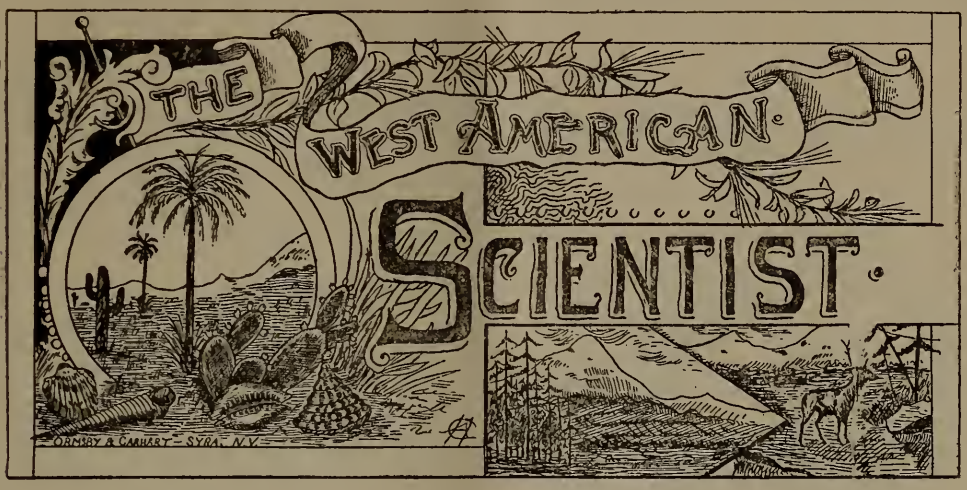

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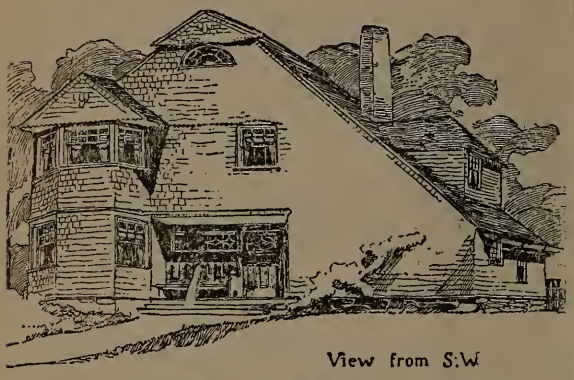

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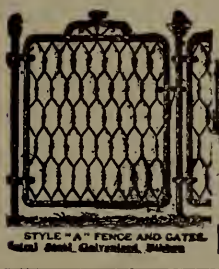

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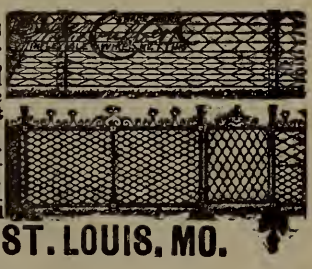

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A popular monthly review and record for the Pacific Coast.

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THE ENGLISH WALNUT.

Before planting a walnut orchard select good, rich, deep valley soil, with an abundance of available water. Plant about forty feet apart—twenty-seven trees to the acre. An equal number of some other kind of fruit tree may be planted between if desired. At eight years of age the improved varieties of walnuts are estimated to yield one hundred pounds to the tree, which at present market prices are worth ten to fifteen cents per pound. But if you can't market them readily, you have the whole year in which to crack them!

Juglans regia is the botanical name of our English walnut or the Madeira nut of commerce, and many cultural varieties have been originated. In California have originated a number of so-called hard and soft shelled varieties. Some strongly advocate the hard shell varieties; others advance claims for the supremacy of the soft shell, which is now gaining in popular favor, especially in Southern California, where it is much more largely propagated than the other sorts.

The soft shell walnut originated in the orchard of Joseph Sexton, of Santa Barbara, and Geo. W. Ford has since secured by selection his improved soft shell, which has proved very prolific and profitable, especially in Orange county. By courtesy of Mr. G. W. Ford, of Santa Ana, California, we give an illustration of his improved variety. The following notes on the culture of this variety is extracted from an essay by Mr. Ford, read before the Thirteenth State Fruit Growers' Convention:

My improved soft shell nuts took the premium at the last Downey fair. I had about one-third of a bushel there, and they averaged twenty-four to the pound. Last year a well-known fruit grower at Tustin raised some soft shells which ran as low as eighteen nuts to the pound.

I plant my walnuts in the nursery rows four feet apart by one foot apart in the row, and do not believe in planting nursery stock of any kind too close. Certainly cheaper trees can be grown by that method, but I have yet to find a stunted tree that ever gave good satisfaction when planted in an orchard.

In planting trees in an orchard, first of all plow the ground deep, then go over it with a harrow or a pulverizer. Dig large and deep holes; plant two or three inches deeper than the trees grew in the nursery; lean them to the prevailing summer winds and you will not have to stake the trees to make them grow straight. Press the soil firmly around the roots, and if not very moist give each tree five or

ten gallons of water, which is sufficient to settle the ground firmly around the roots. Cultivate your orchard to the depth of four or five inches. If the soil is moist enough to keep the tree in good growing condition during the summer months, irrigation is not necessary; but to make a first-class walnut, in size and in the fullness of kernel, if the ground is not naturally moist enough, artificial means will have to be adopted.

My improved soft shell walnut commences to bear at four years from the seed; at six years my trees average fifty pounds of nuts to the tree, while some went as high as seventy-five pounds; at seven years, they averaged ninety-six pounds, and at eight years old, averaged as high as one hundred and twenty-five pounds, while some of the largest trees bear one hundred and fifty pounds of the finest walnuts I have ever seen.

THE WALNUT AND ITS CULTURE.

The walnut is a genus of beautiful trees of the natural order Juglandaceæ, named Juglans from Jovis, the heathen God, and glans a nut. The two most widely known of North American species are Juglans nigra (the black walnut) and Juglans cinerea (the butter nut). But the variety to which we wish to call particular notice, and which is attracting attention among fruit growers in Southern California, is Juglans regia, the common English walnut or Madeira nut. It is classed among the hardy deciduous trees and is a native of Persia. It was introduced into England in 1562, thence distributed over a considerable portion of the globe, wherever the climate and soil is suitable. It is a lofty tree with large spreading branches. Its foliage resembles that of the ash, and the leaves give forth a fine balsamic odor when bruised. By bruising and rubbing on the skin they are said to be a sure cure for the itch. Placed in wardrobes they prevent the ravages of moths. An excellent pickle and a kind of ketchup are made from the unripe fruit. Just before they are ripe they are much used in France with vinegar, salt, pepper and shallots. Walnut oil is a commercial product of Persia and some parts of France, but has attained no proportions in this country. The timber of all kinds of walnuts is very valuable, that of the black walnut sometimes bringing fabulous prices.

In California the English walnut is planted in orchard form for the purpose of raising nuts for the market, and the tree also has special value for shade and a great many streets and avenues are lined with this magnificent tree. Where shade is needed during the

summer and sunlight in winter this tree is found always satisfactory. It makes a splendid growth in California and has been known to have a spread of sixty feet in less than twenty years. The English walnut has proved very profitable along the coast in this state, but at the same time a great many fine groves in the interior give promise of heavy yields. It does best where a deep, rich, moist and loamy soil is to be found, but is doing very well in this climate where the soil is less favorable. Where water is to be had and irrigation is carried on splendid walnuts can be raised on any of the foothills and uplands, but moisture must be had, and a dry and neglected place will not do for the walnut.

The trees are propagated from the seed, which usually come true, being first planted about a foot apart in the nursery row. (The month of January is best for planting). When the seedlings are one year old they may be transplanted into orchard form, and should be set from forty to sixty feet apart each way. Some orchardists advocate leaving the walnut tree in the nursery row until it attains the age of three to five years, but experience will soon show the fallacy of this operation. On the other hand if the seed is planted in orchard form and the seedling never molested, better results will undoubtedly be attained.

Some experimenting has been done at different times in the way of grafting and budding the walnut and the result has well repaid the trouble as several new varieties have been secured that are improvements on the old sort. One new variety that has come into prominent notice is Ford's Improved Soft Shell, which, without doubt, has more excellent qualities than any other. The kernel is of excellent flavor, firm, and always fills the shell well, and is a good keeper as well as a good shipper. Of other varieties we quote from Wickson's "California Fruits."

Common English Walnut:—This is the ordinary English walnut of commerce and is considered very desirable for its shipping qualities, being medium hard shelled, The tree is not as reliable a bearer as the newer sorts and for that reason is not as widely planted as some others.

Santa Barbara Soft Shell:—The soft shell is a little later starting in the spring than the common nut, and blooms about ten days later. It fruits at from four to six years from seed, and usually produces a full crop every year.

This variety is not as strong a grower as the common walnut, and more trees can be placed to the acre, and more nuts can be produced. The kernel is white and very fine. The shells are thin and

break very easily, but cannot be shipped any reasonable distance without damage.

PROEPARTURIENS OR DWARF PROLIFIC:—A choice French variety that has proved itself to be worthy of cultivation in California. It is not truly what its name implies, not being a regular dwarf nor such an early bearer, but the fruit is of an excellent quality and is always in demand where it is known.

PERSIAN WALNUT OR KAGHAZI:—Is very much larger than the ordinary kinds and thin shelled. The tree is late in blooming and therefore is especially good for places that are in danger of frosts.

There are a few other varieties that will no doubt prove valuable in time, but are not worth while describing at present.

The walnut tree is usually headed at a height of six to eight feet, and requires considerable attention in the way of forming a head for the first three or four years. The tree is naturally of spreading habit but if it is trained with an upward tendency more strength can be secured. *L. C. Cummins.*

REVISION OF THE BOMBYLID GENUS APHOEBANTUS.

In the May number of the *Canadian Entomologist* for the year 1886 I gave descriptions of all the species of Aphoebantus (five in number) then known to occur in North America. Since the publication of that paper the Baron Osten Sacken has described six new species from this region, three of which occur in the United States (Biologia Centrali Americana, Part Diptera). In Southern California I have collected specimens belonging to twelve as yet undescribed species, making a total of twenty-three species now known to occur in this country. The following table will aid in identifying the species which occur in the United States. Osten Sacken's Aphoebantus rattus from Texas is unknown to me in nature, and I have given it a place in the accompanying table in accordance with his published description; all the other species of this table are represented in my collection. I have included in this table my Eucessia rubens, which might be mistaken for an Aphoebantus, although lacking the long, style-like prolongation of the third antennal joint:

1. Ground color of the abdomen black..... 2
   Ground color of the abdomen yellow.....13
2. Thorax with two, abdomen with one white tomentose dorsal vittae; pile and tomentum of the face white; styliform portion of third antennal joint once and a fourth times as long as the thickened basal part.....VITTATUS Coq.
   Thorax and abdomen destitute of white tomentose dorsal vittae..... 3

3. Proboscis never projecting more than the length of its labellæ beyond the oral margin..... 4
   Proboscis projecting half its length beyond the oral margin; abdomen with black tomentum, pile of face yellow and white.....LITUS Coq.
4. Front with sub-erect pile, its tomentum when present, sparse. 5
   Front destitute of sub-erect pile, densely white tomentose, pile and tomentum of face white, styliform portion of the third antennal joint two-thirds as long as the thickened basal part.....PAVIDUS Coq.
5. Pile of face white or yellowish white..... 9
   Pile of face wholly golden yellow..... 6
   Pile of face black, that below sometimes reddish..... 7
6. Styliform portion of the third antennal joint equal in length to the thickened basal part, scutellum and hind femora provided with bristles.....CAPAX n. sp.
   Styliform portion of the third antennal joint less than one-third the length of the thickened basal part.....RATTUS O. S.
7. Abdomen with crossbands of black tomentum..... 8
   Abdomen destitute of crossbands of black tomentum; face sparse tomentose, hind femora with a few bristles but no long hairs below.....TARDUS n. sp.
8, Hind femora with long hairs besides the bristles below, face sparse yellowish tomentose.....DESERTUS n. sp.
   Hind femora with bristles but no long hairs below, face destitute of tomentum, abdomen with crossbands of black tomentum.....SCRIPTUS n. sp.
9. Hind femora with bristles on the lower surface.....21
   Hind femora with long hairs but no bristles on the under surface.....10
10. Abdomen destitute of black tomentum.....11
    Abdomen with crossbands of black tomentum, styliform portion of the third antennal joint nearly twice as long as the thickened basal part.....CARBONARIUS O. S.
11. Styliform portion of the third antennal joint at least two-thirds as long as the thickened basal part.....18
    Styliform portion less than one-third as long as the thickened basal part.....RATTUS O. S.
12. Styliform portion of the third antennal joint equal in length to the thickened basal part.....14
    Styliform portion twice as long as the thickened basal part; dorsum of abdomen rather densely clothed with long white or yellowish white pile.....22
13. Abdomen with a white tomentose dorsal vittae, upper part of the face bare, pile of front disposed in two stripes.....
    .....EUCESSIA RUBENS Coq.
    Abdomen destitute of a white tomentose dorsal vittae, upper part of the face pilose, pile of front not disposed in stripes..
    .....VARIUS n. sp.
14. Abdomen with crossbands of black tomentum, these sometimes interrupted.....15
    Abdomen destitute of black tomentum.....16

15. Black tomentose crossbands of abdomen interrupted in the middle 17
    Black tomentose crossbands entire, never interrupted in the middle ..... BREVISTYLUS n. sp.
16. Hind margin of the scutellum opaque, covered with tomentum 19
    Hind margin of the scutellum polished black and destitute of tomentum except in the middle ..... CONURUS O. S.
17. Hind margin of the scutellum polished black and destitute of tomentum except in the middle; front destitute of tomentum ..... INTERRUPTUS n. sp.
    Hind margin of the scutellum opaque and clothed with tomentum, front sparse whitish tomentose ..... MIXTUS n. sp.
18. Styliform portion of the third antennal joint as long as the thickened basal part; tibiæ yellow; length of body 8 to 9 mm ..... MARCIDUS n. sp.
    Styliform portion only two-thirds as long as the thickened basal part; tibiæ black; length of body 3 to 6 mm. (male) ..... PAVIDUS Coq.
19. Pile of front white, or yellowish white 20
    Pile of front black, hind femora with bristles but no hairs below ..... CERVINUS Lw.
20. Hind femora with several hairs besides the usual bristles below, hypopygium of the male only one-half longer than the last abdominal segment ..... SQUAMOSUS n. sp.
    Hind femora with a few bristles but no long hairs below, hypopygium of the male unusually large, over one-half as long as the abdomen ..... ABNORMIS n. sp.
21. Wings, except the subcostal cell, wholly hyaline 12
    Wings with the costal cell, bases of first and second basal cells, and of the anal and axillary cells, brownish; femora reddish brown ..... FUMIDUS n. sp.
22. Crossbands of black tomentum of abdomen of female very distinct and at least six times as broad as those of white tomentum ..... MUS O. S.
    Crossbands indistinct and scarcely any wider than those of white tomentum ..... HIRSUTUS Coq.

APHOEBANTUS VARIUS n. sp.—Female. Head black, front gray pollinose, sparse short white pilose, yellowish tomentose, that on the sides below white; face gray pollinose, white tomentose and sparse short white pilose. Antennæ black, third joint over twice as long as the first two united, the styliform portion slightly over one-half as long as the thickened basal part. Proboscis not projecting beyond the oral margin. Occiput white tomentose, that on the upper part yellowish. Thorax black, yellowish tomentose, that on the sides and anterior end white; short sparse white pilose, the bristles also white; pleura dense white pilose and tomentose. Scutellum black, rounded behind, yellowish tomentose, a spot of white tomentum each side near the base; the usual bristles white. Abdo-

men yellow except sometimes a light brownish spot in middle of segments 2, 3 and 4, middle of segment 5 and greater portion of 6 and 7; hind margins of segments 2, 3 and 4 usually white; tomentum of the abdomen pale yellowish, that on the first segment, on hind margins of the remaining segments, and on sides of abdomen near the base, white; pile of abdomen white, very sparse and short, longer and more abundant on the sides; venter pale yellow, white tomentose. Legs light yellow, the front femora laregly brown, tomentum and bristles white, hind femora each with 3 or 4 bristles but no long hairs below. Wings wholly hyaline. Knob of halteres sulphur yellow, the stalk white.

Male, same as the female, the eyes being as widely separated on the front; hypopygium very small.

Length 3.5 to 5 mm. San Diego county, Cal. Three males and five females in May.

APHOEBANTUS PAVIDUS Coquillett.—Female. Black. Front densely white tomentose, destitute of erect pile; face densely white tomentose and sub-depressed white pilose. Proboscis not projecting beyond the oral margin. Antennæ with the styliform portion of the third joint two-thirds as long as the thickened basal part. Occiput white tomentose. Thorax in front white tomentose, elsewhere yellowish tomentose, the bristles also yellowish; pleura gray pollinose, its pile and tomentum white. Scutellum opaque, yellowish tomentose, that on the margin white, the bristles yellowish. Abdomen yellowish tomentose, and with a crossband of white tomentum at the base of each segment except the first, where the band is at the apex; dorsum of abdomen nearly destitute of pile, that along the sides rather abundant and white; venter snow-white tomentose and pilose. Legs white tomentose, the bristles reddish; hind femora each with two bristles and a few long hairs or weak bristles below; middle femora each with a single bristle in front and a fringe of white pile behind. Knob of halteres yellowish-white, the stalk darker yellow. Wings hyaline, apex of subcostal cell yellowish.

Male differs from the female as follows: Front with sparse, sub-depressed white pile. Tibiæ usually yellowish. Eyes meet each other for a short distance on the front. Hypopygium large, not dilated below, slightly longer than the last two abdominal segments, its sides and lower surface white tomentose.

Length 3 to 6 mm. Los Angeles, San Diego and Kern counties, Cal. Three males and seven females, in May and June.

I formerly regarded this as being a mere variety of cervinus

Loew, and described it as such, but there can be no doubt of its belonging to a distinct species.

APHOEBANTUS TARDUS n. sp.—Female. Black. Front and face gray pollinose, sparse yellow tomentose and black pilose. Proboscis not projecting beyond the oral margin. Antennæ with the first two joints sparse black pilose; styliform portion of the third joint once and a half as long as the thickened basal part. Occiput white tomentose, that above yellowish. Thorax yellow tomentose and sparse short white pilose, the bristles also white; pleura white tomentose and pilose. Scutellum sub-opaque, yellow tomentose, the bristles also yellowish. Abdomen yellow tomentose, that on apex of each segment white; dorsum very short sparse white pilose, that on the sides longer and more dense; venter white tomentose and pilose. Legs white tomentose, the bristles yellowish; hind femora each with two bristles but no long hairs beneath; middle femora each with one or two bristles in front and numerous rather long hairs behind. Halteres wholly light yellow. Wings hyaline, apex of subcostal cell yellowish.

Male differs from the female in having the pile of thorax and abdomen longer and more dense. Eyes meet each other for quite a long distance on the front. Hypopygium moderate, not dilated below, equal in length to the last two abdominal segments.

Length 5 to 9 mm. Los Angeles, San Diego and Kern counties, Cal. Four males and five females, in May and June.

APHOEBANTUS MARCIDUS n. sp.—Female. Black, the tibiæ and basi of tarsi yellowish. Front and face gray pollinose, sparse white tomentose and pilose. Proboscis not projecting beyond the oral margin. Antennæ lightly gray pollinose, sparse white pilose; styliform portion of the third joint equal in length to the thickened basal part. Occiput dense white tomentose and sparse white pilose. Thorax white tomentose and sparse white pilose, the bristles also white; pile and tomentum of pleura white. Scutellum opaque, white tomentose, the bristles also white. Abdomen white tomentose and rather abundant white pilose; ventor snow-white tomentose and pilose. Legs white tomentose, bristles of tibiæ reddish; hind and middle femora with many long hairs but no bristles below. Halteres yellowish-white, the stalk darker toward the base. Wings wholly hyaline.

Male differs from the female in having the tomentum of the front, thorax, scutellum and abdomen light yellowish, bristles of thorax and scutellum also yellowish. Eyes meet each other for some distance on the front. Hypopygium large, scarcely dilated below,

equal in length to the last two abdominal segments, gray pollinose except a large spot each side, the under surface white tomentose.

Length 8 to 9 mm. San Diego and Kern counties, Cal. A single male and female, in May and June.

APHOEBANTUS MIXTUS n. sp.—Female. Black. Front gray pollinose, sparse whitish tomentose and black pilose; face destitute of tomentum, gray pollinose and white pilose. Proboscis not projecting beyond the oral margin. Antennæ with first two joints sparse white pilose; styliform portion of the third joint equal in length to the thickened basal part. Occiput white tomentose. Thorax yellow tomentose and sparse black pilose, that on the front end yellowish, bristles reddish and black; pleura gray pollinose, the pile and tomentum white. Scutellum opaque, yellowish tomentose, the bristles reddish. Abdomen black, white and light yellow tomentose, the white forming a crossband on the hind end of segments 2 to 5; the black forming crossbands, interrupted in the middle, on segments 2 and 3, being intermixed with light yellow tomentum which is most abundant on the posterior half of the body, the last two segments being destitute of black tomentum; pile of dorsum very short and sparse, that along the sides longer but very sparse except on the first segment where it is quite dense, white; venter white tomentose and pilose. Legs white tomentose, the bristles yellowish; hind femora with two small bristles but no long hairs below, middle femora destitute of bristles and of long hairs. Knob of halteres whitish, the stalk yellow. Wings hyaline, apex of subcostal cell yellowish.

Length 6 mm. San Bernardino county, Cal. A single female, in July.

APHOEBANTUS INTERRUPTUS n. sp.—Female. Black, the tibiæ and base of tarsi yellowish. Front and face gray pollinose, destitute of tomentum; pile of front black, reddish and white, the latter situated nearest the antennæ; pile of face white. Proboscis never projecting more than one fourth the length of its labellæ beyond the oral margin. Antennæ with first two joints gray pollinose, pile above yellowish, that below white; styliform portion of the third joint equal in length to the thickened basal part. Occiput gray pollinose, sparse yellowish-white pilose, next the eyes below white tomentose. Thorax yellow tomentose and sparse black pilose, that on the front end yellowish, bristles reddish and black; pleura gray pollinose and white tomentose, the pile yellowish and white. Scutellum rounded behind, polished black, the base and a median stripe reaching the apex yellow tomentose, the bristles black. Abdomen with first segment and base of the second white tomentose, the

remainder black and yellow tomentose, the black forming six interrupted crossbands; pile white, on sides of first segment very abundant, elsewhere very sparse; venter white tomentose and pilose. Legs white tomentose, that on apex of hind femora and on hind tibiæ yellowish; hind femora each with from four to eight bristles but no long hairs below; middle femora each with two or three bristles in front. Halteres dark brown, base of the stalk yellow. Wings hyaline, apex of the subcostal cell yellowish.

Male differs from the female in having only five interrupted crossbands of black tomentum on the abdomen, and there is a crossband of rather long white pile on hind end of segments 2 to 6. Eyes meet each other for a considerable distance on the front. Hypopygium very large, not dilated below, about equalling the last two abdominal segments in length, gray pollinose and very short sparse white pilose, destitute of tomentum.

Length 5 to 7 mm. Los Angeles county, Cal. Seven males and three females, in June.

APHOEBANTUS SCRIPTUS n. sp. Female. Black. Front gray pollinose, black pilose and sparse whitish tomentose; face gray pollinose, destitute of tomentum, black and reddish pilose, the latter situated nearest the mouth. Proboscis never projecting more than one-fourth the length of its labellæ beyond the oral margin. Antennæ with first two joints sparse black pilose; styliform portion of the third joint once and a half as long as the thickened basal part. Occiput white and yellow tomentose, the latter most abundant on the upper part. Thorax yellow tomentose and sparse black pilose, that on the front end yellowish, bristles black and reddish; pleura gray pollinose and white tomentose, its pile yellowish and white. Scutellum sub-opaque, yellowish tomentose, the bristles reddish and black. Abdomen with alternate crossbands of light yellowish and black tomentum, the black ones being five in number, the last or seventh segment being destitute of black tomentum; pile of dorsum very short and sparse, of the sides longer and that on the first two segments quite dense, white; venter white tomentose and pilose. Legs yellowish-white tomentose, the bristles reddish; hind femora each with three bristles but no long hairs below, middle femora each with three bristles in front. Halteres yellowish-white. Wings hyaline, apex of the subcostal cell yellowish.

Male differs from the female in having the black tomentum of the abdomen confined to a medio-dorsal spot on segments 2 to 6, the yellowish-white tomentum rather sparse, the dorsum and sides with quite long and abundant erect whitish pile. Eyes meet each other for a short distance on the front. Hypopygium rather small,

not dilated below, about three fourths as long as the last two abdominal segments united.

APHOEBANTUS DESERTUS n. sp.—Female. Black. Front and face sparse yellowish tomentose and erect black pilose. Proboscis not projecting beyond the oral margin. Antennæ with the first two joints sparse black pilose; styliform portion of the third joint once and a half as long as the thickened basal part. Occiput whitish tomentose. Thorax yellow tomentose and sparse black pilose, that on the front end yellowish, bristles reddish and black; pleura gray pollinose and white tomentose, its pile yellowish and white. Scutellum yellowish tomentose, the bristles reddish. Abdomen with alternate crossbands of black and whitish tomentum, the dorsum with scattered quite long black pile, the sides with denser white pile; venter white tomentose and pilose. Legs with the femora whitish tomentose, the bristles reddish; hind femora each with from one to five bristles and numerous long hairs below, middle femora each with four or five bristles below and with many long hairs behind. Knob of halteres light yellow, the stalk brown. Wings hyaline, apex of the subcostal cell yellowish. Length 9 to 10 mm. San Diego county, Cal. Two females, in May.

APHOEBANTUS CAPAX n. sp.—Female. Black, tibiæ and base of tarsi yellowish. Front sparse yellow tomentose, black and reddish pilose, the latter situated next the antennæ; face destitute of tomentum, golden-yellow pilose. Proboscis not projecting beyond the oral margin. Antennæ with first two joints sparse black pilose; styliform portion of the third joint equal in length to the thickened basal part. Occiput yellowish tomentose. Thorax yellow tomentose and sparse yellowish pilose, the bristles reddish; pleura gray pollinose and white tomentose, the pile yellowish and white. Scutellum yellowish-white tomentose, the bristles also yellowish white. Abdomen with alternate crossbands of yellowish-white and black tomentum, the dorsum almost destitute of erect pile, the sides very sparse pilose except on the first two segments where it is abundant, white; venter white tomentose and pilose. Legs yellowish-white tomentose, the bristles reddish; hind femora each with four bristles but no long hairs below, middle femora each with two bristles in front and a fringe of rather long pile behind. Knob of halteres yellowish-white, the stalk brown. Wings hyaline, apex of the subcostal cell yellowish.

Male differs from the female in having the pile of the front golden-yellow, of the first two antennal joints reddish, face sparse yellowish tomentose, pile of lower part of occiput white, tomentose crossbands of abdomen yellow and whitish, dorsum of abdomen

with crossbands of rather long erect pile on hind end of each segment, the sides quite abundant pilose. Eyes narrowly separated on the front. Hypopygium very small, not dilated below, almost concealed within the last abdominal segment.

Length 7 to 10 mm. San Diego county, Cal. A single male and female, in May.

Although differing from each other somewhat in the coloring of the pile and tomentum, still it is highly probable that these two forms are the opposite sexes of the same species; they were captured at the same time and place, are essentially alike in structure, and they are the only forms known to me in which the pile of the face is golden-yellow.

APHOEBANTUS ABNORMIS n. sp.—Female. Black, the tibiæ and tarsi reddish. Front yellowish-white tomentose and reddish or yellowish-white pilose; face white tomentose and pilose. Proboscis not projecting beyond the oral margin. Antennæ with the first two joints sparse yellowish-white pilose; styliform portion of the third joint equal in length to the thickened basal part. Occiput white tomentose, that above yellowish. Thorax yellowish-brown tomentose, that on the sides and front end white; bristles reddish; pleura white tomentose, the pile white and yellowish. Scutellum opake, yellowish-brown tomentose, the bristles numerous, reddish, some of them situated on the upper surface. Abdomen yellowish-brown tomentose, that on extreme apex of each segment lighter, apex of each segment with a crossband of short reddish pile, elsewhere the dorsum is almost destitute of pile; sides of abdomen short sparse reddish pilose, that on the first two segments longer, more abundant, white; venter white tomentose and sparse yellowish-white pilose. Legs white tomentose, that on the tibiæ mixed with yellow; the bristles reddish; hind femora each with four bristles but no hairs below, middle femora each with three or four bristles in front and a fringe of short pile behind. Knob of halteres light yellow, the stalk dark yellow. Wings hyaline, apex of the subcostal cell yellowish.

Male same as the female except the sexual characters. Eyes meet each other for some distance on the front. Hypopygium unusually large, laterally compressed, more than half as large as the abdomen, divided lengthwise into an upper and a lower piece, the latter scarcely one-fourth as large as the upper one which is curved downward; apex of each piece bifurcated, the prongs on one piece projecting toward those on the opposite piece; hind end of upper piece provided with an elongated, nearly perpendicular piece of a jet black color narrowly bordered with white; hypopygium opaque,

white tomentose and short sparse yellow pilose, the pile most abundant on the lower piece.

Length 8 to 9 mm. Orange county, Cal. Three males and two females.

The hypopygium of the male is very much larger than that of any of the other males described in this paper; when viewed from the side it has a close resemblance to the beak of a parrot.

APHOEBANTUS SQUAMOSUS n. sp.—Female same as above description of abnormis with these exceptions: Bristles of scutellum confined to the margin—none on its upper surface. Hind femora each with three or four bristles and numerous short hairs or weak bristles below.

Male same as the female except the sexual characters. Eyes meet each other for a considerable distance on the front. Hypopygium small, not dilated below, once and a half as long as the last, or sixth abdominal segment; opaque, white tomentose and sparse yellowish pilose.

Length 7 to 10.5 mm. Orange county, Cal. A male and female captured in coition.

APHOEBANTUS FUMIDUS n. sp. Male. Black, the femora, tibiæ and base of the tarsi reddish. Front and face sparse yellowish-white tomentose and pilose. Proboscis not projecting beyond the oral margin. Antennæ with the first two joints sparse whitish pilose; styliform portion of the third joint only half as long as the thickened basal part. Eyes meet each other for a short distance on the front. Occiput white tomentose. Thorax light yellow tomentose, forming three indistinct light colored vittæ where the tomentum is most dense; bristles reddish; pleura white tomentose, the pile white and yellowish. Scutellum opake, light yellow tomentose, the bristles weak and reddish. Abdomen light yellow tomentose, a crossband of white tomentum at apex of the first segment and a light colored one at the apex of each of the remaining segments; pile sparse but rather long, whitish, that along the sides more abundant and yellowish; venter white tomentose and pilose. Hypopygium rather small, scarcely dilated below, nearly as long as the last three segments united, opake, sparse whitish pilose, destitute of tomentum; lower piece hollowed out, like a trough, to receive the upper piece which rests in it and is cleft in the middle from apex to the base, each piece tapering to the tip; apex of lower piece obliquely truncated. Legs light yellow tomentose, the bristles also yellow; hind femora each with two bristles and numerous short hairs below and with a row of five or six bristles behind; middle femora destitute of bristles below. Knob of halteres light

yellow, the stalk darker. Wings hyaline, the base tinged with smoky brown, which color fills the costal and subcostal cells, basal half of the first basal cell and bases of the second basal, anal and axillary cells, the outward limit of the brown coloring not well defined.

Length 6 mm. San Bernardino county, Cal. Two males, in July.

APHOEBANTUS BREVISTYLUS n. sp.—Female. Black. Front gray pollinose, destitute of tomentum, its pile mixed black, reddish and white; face white pilose, destitute of tomentum. Proboscis not projecting beyond the oral margin. Antennæ with the first two joints white pilose, the styliform portion of the third joint once and a fourth as long as the thickened basal part. Occiput white tomentose. Thorax light yellow tomentose, the bristles yellowish white, pile of the sides, pleura, breast and coxæ white. Scutellum light yellow tomentose, the bristles yellowish-white. Abdomen with six alternate broad black and narrower light yellow tomentose crossbands the latter situated at the apex of each segment except the first, the black crossbands bordered on the sides with light yellow tomentum beneath which and on the venter the tomentum is white; pile of dorsum very sparse, that on first segment, sides of remaining segments and on the venter rather abundant, white. Legs white tomentose, hind femora each with two bristles but no long hairs beneath, middle femora each with one or two bristles in front. Wings, except apex of subcostal cell, wholly hyaline. Halteres yellow, the knob largely dark brown.

Length 6.5 to 8 mm. Los Angeles county, Cal. Two females, in June. *D. W. Coquillett.*

THE CONVOLVULUS.

The morning glory is a flower,
With smiles of welcome beaming,
In red or white or blue arrayed,
'Tis still of beauty dreaming.

Oft I say to it, 'good morning,'
It really is so winning;
With its companionship, the day
In glory makes beginning.

Mrs. E. E. Orcutt.

NOTES ON PLANTING.

One of the most conspicuous vines of Honolulu is the Bougainvillæa. It is seen growing all over a barn, a whole side of a house or to the top of some tall tree. To keep it within bounds is a care, so rank a grower is it in the tropics.

This vine is a very interesting plant, brilliant with its profusion of rich magenta flowers, that are really not flowers at all, but only large bracts about the three small tubular cream colored flowers. At San Diego the Bougainvillæa is more common than at any other place in Southern California. At San Francisco and the east it is only grown in the conservatory, and therefore is very attractive to the visitors here. There are three varieties, all natives of Brazil and in cultivation for about thirty years.

The commonest and oldest variety in San Diego is the B. speciosa, having very wooly leaves, and blooming during the winter. This sort is very hard to propagate and does not bloom freely until three to four years old. B. glabra has a bright, glossy green foliage, is as rank growing and blooms early and freely, and is virtually an ever-bloomer, but the flowering is most profuse during the summer.

Owing to the dazzling magenta color of the flower and the profusion of the bloom, this vine is a trying one for a small garden, as every shade of red and pink in the vicinity is ruined.

It should be planted apart from other vines and given a whole veranda, trellis, barn or side of a house—even to the top—or an arbor at the back of the lawn or among trees. Don't discard the Bougainvillæa, but put it in the right place, and you will have a plant of oriental splendor. If other vines are planted near by, select the white flowering sorts.

Palms are one of the most decorative and lasting of plants in cultivation and should receive a great deal more attention than has been given or thought of thus far by those planting in San Diego. The order being pre-eminently tropical in its distribution, every sort that can be grown here should be cultivated, for they give to our gardens a feature never possible in the cooler climates.

Palms are not difficult of cultivation, but they need good drainage and an abundant supply of water and considerable enriching during the summer, their growing season. It is always best to plant about April, rather than during the winter and they should be established in boxes or pots if the best results are desired. Young and thrifty palms are better than old and large ones, for the latter suffer so much in transplanting that it often requires years to overcome the effects.

One of the hardiest and most effective of these dwarf palms is the Cycas revoluta, the extensive cultivation of which by the Japanese, the most artistic gardeners of the world, is one of its best recommendations. At the Coronado hotel court are two plants, three to four feet high, standing in the extreme southeast and southwest corners of the court.

Though choice plants when set they have made a remarkable growth, and are now exceptionally handsome specimens. One has just thrown up a flower stalk over one foot high, and the plants will be most interesting during this summer, and well worthy of close observation. Such plants in boxes could not be duplicated in California for less than $100 each. The value of this palm is rated by the height and diameter of the trunk as well as by the condition of the foliage, and when exported from Japan are sent bare of leaves and sold by the pound. It requires about three years for a small plant to become well established, and after that the growth is quite rapid.

Seaforthia elegans is a beautiful palm, well known by all lovers of decorative plants, and extensively grown in all large conservatories in the east and Europe.

It grows with a slim, bare trunk, free from leaf scars, the huge, graceful, plume-like leaves growing only from the top. It occupies, even when large, only a small amount of ground space, towers high and casts but little shade. This palm thrives well in the open air in San Diego and is deserving of extensive cultivation. As sheltered a location as possible is best, for the wind will often whip and break the pinnae of the large leaf.

Seaforthia robusta is an equally handsome palm and is shown by but one beautiful plant in the Hotel Coronado court. It bears more leaves and does not have as tall a trunk as S. elegans. The leaves are very beautiful and graceful like plumes and are not easily broken by the wind.

After observing these two sorts of seaforthias in the Coronado hotel court, as they grow side by side, turn to the two Royal palms, on either side of the fountain there growing. They were brought from Honolulu when the stems were about six inches in diameter, and in three years you can see the change. They are a very fast growing palm and the larger one is now the tallest plant in the court. At Honolulu the sky is fairly brushed with their regal plumes.

Lower California and her Pacific islands are the home of three handsome fan palms, all to be seen growing luxuriantly in this city, and are well worth attention and study.

The Washingtonia filifera, the common fan palm, is so named on account of the thread-like filaments hanging from the fans and most conspicuous on the young growth. The oldest specimens are in the gardens of Mr. W. W. Stewart and Mr. E. W. Morse. They are not over twenty years from seed. Within a few years the double row on Orange avenue, Coronado, will be one of the sights of Southern California, every plant perfect and none missing to mar the symmetry.

This variety is better for large grounds, avenue and park cultivation than for small gardens, where some of the rarer and slower growing palms are more desirable. In its native home it is found in canyons along the water course.

The Guadalupe islands palm or Erythea edulis is so named because of the edible fleshy pulp above the nut. This sort has very large, smooth, dark green fans and is more spreading in habit than the common fan. It is very beautiful, and more graceful when allowed plenty of room and should be grown extensively in parks and on lawns.

Erythea armata, the blue palm, grows in canyons on the desert side of the mountains, about thirty miles below the U. S. boundary line. It is one of the most beautiful of cultivated palms, its very slow growth being an advantage. The delicate grayish blue color of its foliage and stems makes it a most effective palm for the lawn or for grouping with contrasting foliage and its cultivation in small yards should be much more extensive. The largest plants in the city are at Mr. E. W. Morse's, and are about fifteen years old. This sort is difficult to transplant unless set from a pot or box.

All of these three native palms are grown from the seed, which usually germinates in three to twelve months when sown in the open ground. The blue palm seed sometimes takes three years in which to germinate!

The summer or growing season is the only time of year when the palms need care, plenty of water and enriching. As a rule the plants are trimmed too severely. Unless a leaf is dead or broken it should not be removed.

The Ficus or fig family is a large and useful one, furnishing the fig of commerce, the India rubber producing tree of the tropics and not a few ornamental trees and shrubs. If you will observe the large rubber tree on Eighth street, between C and D, on the east side, with its large dark green leaves and strong, substantial trunk, and then compare the shrubby tree directly opposite on the west side with similar but smaller leaves quite a lesson can be learned. The former is the Ficus macrophyllum (meaning large leaf) or the

Australian rubber tree often called the Moreton Bay fig. This does not produce the rubber of commerce, but it is one of the grandest trees in cultivation where a large and spreading shade tree is needed. The smaller leaved variety is Ficus australis and is more desirable for a large shrub and for grouping than for shade.

The Australian rubber tree is planted extensively on the sidewalks and roadways of Melbourne, a city famous for her magnificent avenues. On the park charity tract last spring a double row of 100 of these trees was set, which, I believe, is the only long avenue of them in the state. The cost has been a drawback to extensive planting, while the climate of northern California is too severe for successful cultivation on streets. Ten years hence these rows will form grand avenues of shade, fully fifty feet high.

The best Ficus for planting within the gardens of the city, unless the grounds are spacious, is the true India rubber tree, the ficus elastica. It is of smaller growth yet, branching with the most beautiful foliage of all the rubbers, shading from the darkest green to russet brown. *Miss K. O. Sessions.*

APRICOTS.

California is peculiarly adapted for the growth of the apricot. Although the apricot has been grown here from the earliest days of the American occupation, and though since the opening of the export trade in canned and dried fruits, the planting of apricot orchards has proceeded with great rapidity, present indications are that our distant patrons are only just beginning to recognize the desirability of the fruit, and that their demands will make it wellnigh impossible for us to extend our production beyond profitable limits.

The apricot is comparatively a long lived tree as well as a rapid grower and heavy bearer in California. A paying crop is usually secured the third year from planting. As a windbreak the apricot is a complete success. Most all trees shrink away from the tradewinds but the apricot leans a little toward it and is thickest of foliage on that side. Where the pits are sown in a row and the young seedlings thinned to about a foot apart in two years' time a hedge and windbreak will be produced that will withstand any ordinary wind.

Of all California orchard trees the apricot needs more attention in the way of pruning than any other.

It is a rampant grower, and in its zealous haste for size and fruitage it over-reaches itself and becomes the prey of specific gravity

and wind force. This excessive growth and consequent weakness of the apricot is greater in some parts of the state than others because of the indifference in degree of forcing conditions, but everywhere the apricot needs watchfulness and timely aid in building up its strength. Space forbids us going into details in regard to pruning this valuable tree. But we advise any one who seeks a knowledge of the business to purchase a copy of 'California Fruits', as it is a thorough treatise on this desirable fruit. We herewith give descriptions of a few choice varieties:

ROYAL:—A French variety and at present the leading apricot in California; of large size, if well thinned, free stone, fine color and flavor; good bearer and ripens evenly. A favorite with the canners and an excellent variety for drying. Fruit roundish, large, oval, slightly compressed; skin dull yellow with orange check, flesh pale orange, firm and juicy with a rich vinous flavor.

BLENHEIM:—A very good variety, above medium, oval; orange with deep yellow, juicy and tolerably rich flesh; vigorous grower and regular, prolific bearer, Fruit a little larger and ripens a little later than the Royal.

EARLY GOLDEN:—Small roundish oval with suture well marked and extending half way around; skin smooth, pale orange, flesh yellow, with very good flavor, free stone; ripens before Royal.

CONTRIBUTIONS TO WEST AMERICAN MOLLUSCA.—II.

The object of this series of papers is to collect, and present in connected form, stray notes and observations on the mollusca of West America, with full biographical references and synonymy.

PUPIDAE.

PUPA DALLIANA Sterki, Nautilus, iv. 19. Clear lake, Lake Co., Cal. (Hemphill). Named in honor of Wm. H. Dall, of the United States National Museum.

PUPA CALIFORNICA Rowell. San Francisco to Monterey, Cal.

PUPA CALIFORNICA TRINOTATA Sterki, Nautilus, iv. 18. Monterey, Cal. (Hemphill).

PUPA CALIFORNICA DIEGOENSIS Sterki, Nautilus, iv. 18. San Diego, Cal. (Hemphill).

PUPA CALIFORNICA CYCLOPS Sterki, Nautilus, iv. 18. Rocklin, Placer Co., Cal.

PUPA CALIFORNICA ELONGATA Sterki, Nautilus, iv. 8. San Clemente island, Cal. (Hemphill.)

PUPA CALIFORNICA CATALINARI Sterki, Nautilus, iv. 8. Santa Catalina island, Cal. (Hemphill).

PUPA CALAMITOSA Pilsbry, Proc. Acad. Nat. Sci., Phil., 1889, p. 411. Near Santa Tomas, Lower California (Hemphill). San Diego, Cal. (Orcutt.)

PUPA STERKIANA Pilsbry, Proc. Acad. Nat. Sci., Phil., 1889, p. 412. Near San Quentin bay, Lower California, on lichens (Orcutt). Distributed as P. chordata Pfr. by the writer. The largest known West American species.

PUPA HEMPHILLI Sterki, Nautilus, ix. 27. Near Santa Tomas, Lower California, and San Diego, Calif. (Hemphill).

PUPA ROWELLI Newcomb. Near Oakland, Monterey, San Bernardino, and in El Dorado county, Cal. (fide Binney).

PUPA ARIZONENSIS Gabb, Amer. Jour. Con. ii. 331. Ft. Grant, Arizona; Nevada; Utah.

PUPA HORDACEA Gabb, Amer. Jour. Con. ii. 331. Ft. Grant, Arizona.

PUPA ORCUTTI Pilsbry, ined. Near San Quentin bay, Lower California, on lichens (Orcutt).

PUPA CORPULENTA Morse. Nevada; Colorado.

PUPA ALTICOLA Ingersol. Colorado. *C. R. Orcutt.*

PHACELIA CAMPANULARIA.

This California annual has received a first-class certificate from the Royal Horticultural Society of England, where it was introduced a few years ago through Messrs. Parish. In habit it resembles the well known Phacelia Whitlavia (Whitlavia grandiflora of seedsmen), but it has a more spreading and bushy habit of growth and produces a greater abundance of flowers. The campanulate flowers are large and numerous, violet purple or deep gentian blue, produced in terminal racemes of from twelve to twenty or more flowers which are developed in succession. Each flower is about three fourths of an inch across, of an erect campanulate form, with a spreading five lobed limb, and a short funnel shaped tube, marked in the throat with fine oblong white spots. An average plant will cover nine square inches of ground in cultivation according to an English grower.

Its greatest attraction rests on its large and numerous satiny blue flowers, of a shade rivaling that of Salvia patens. It is a native of Southern California, where it was first found, in the mountains back of San Diego, by Daniel Cleveland and described by Dr. Asa Gray in his Synoptical Flora of North America, vol. ii, p. 164.

A LETTER FROM DR. GEO. ENGELMANN TO DR. C. C. PARRY.

St. Louis, Mo., Jan. 10, 1883.

Dear Parry: If you really leave the 15th these lines will scarcely reach you, but they will greet you on the return from a glorious trip. Thanks for the Cactus seed and Rose.

You complain of my not writing—I think I have been doing nothing in all December but writing to you; at all events I wrote on the 27th which you ought to have had when you wrote last. My letter of the 19th has been already answered—I got yours on the 5th. You see that the Rose has made sensation in Rose circles and will, no doubt, be highly prized by cultivators, but whether you will be able to get it to Europe alive?

I have been overhauling Plantago lately. You sent me Plantago Bigelovii from near San Diego some time ago. The small slender thing is correct, but there was another bigger woolly headed thing mixed with it, which is nothing but P. Patagonica, a dwarf form.

When will I publish Cereus? Perhaps in the next world—for I see no possibility to get at it soon, and my time here may soon be out! What a mess of unfinished business will I leave behind.

Remember me to Cleveland. I suppose he has got my Boundary Cactaceæ now.

So you will take the ladies along! Remember me kindly to both of them; I will be with you in spirit! I have only a few days ago handled Euphorbia misera which Miss Smith helped me gather on Point Loma two years ago. My herbarium is not only a source of scientific delight, but the best journal I could have; every specimen brings scenery and surroundings up like a magic lantern. There are the bushes of E. misera, and there the curious sea formations, and there Miss Smith and her father, and up and far west of us the lighthouse—and then the lunch—Oh, it was nice! But the big stick of Opuntia prolifera I could not master with my knife—could you with an ax get one! Between old and new San Diego I believe I have seen them four or five inches thick.

And now good luck for your trip. Will you also settle Agave Pringlei. Yours ever, *G. Engelmann.*

[The above letter will be read with interest by many botanists, and is reproduced by permission from the correspondence of the late Dr. Parry. The rose referred to is Rose minutifolia, a remarkable new species discovered by Dr. Parry and others in Lower California in 1882. The charming reference to the pleasures derived from the possession of an herbarium will be appreciated by every collector.—Editor.]

COBŒA SCANDENS.

(From *Vicks Magazine*, xiv. 250.)

On account of its rapid growth Cobœa scandens is one of the best of climbing annuals. It has attractive foliage and large, bell-shaped flowers which are, at first, of a greenish hue, changing rapidly to purple. The plants commence to blossom when quite small, and continue until frost. Under favorable circumstances they make an immense growth, sometimes making a height of twenty-five or thirty feet in a season. The seeds are hard to germinate and should be started in the house. Make the soil moist and plant the seeds edge downwards, and give no water until the seedlings are up, unless the soil in which they are planted becomes very dry. Sow seeds in March or April, and as soon as the plants are large and strong enough, remove a part of them to small pots and keep shaded a few days. As the weather grows warm gradually accustom them to out-door air, and plant out when all danger from frost is past. The soil where they are to grow should be well and deeply worked with plenty of old manure added. In dry weather water liberally, and an occasional watering with liquid manure will help them 'rush' business. Some people remove the plants from the garden, where they have done duty all summer, to the house for winter blooming, but a better way is to plant seed in August for winter blooming, or secure young plants by layering, which can be done at almost any time of the year by the following method: 'Cut a notch near a joint, place in a pot and fill with soil and keep the soil moist.' They will be from two to four weeks rooting. It is a fine vine for parlor growth, withstanding the effects of gas and coal-heated air. It is not what can be called a tender plant, yet it needs sunshine, warmth, a rich, friable soil and plenty of water. If allowed to suffer for the want of water it will soon perish. Its tendrils are very clinging and will seek to support themselves by clinging to anything it can reach. It branches very freely, thus enabling a single plant to quickly cover a large surface. *Dorothy Lincoln.*

WEASELS AS GOPHER AND SQUIRREL EXTERMINATORS.

An article has been going the rounds of the newspapers in Southern California to the effect that weasels were used in some places for the extermination of squirrels and gophers. Thus being brought before the public, the qnery has been, are they a success, and if so, how can they be handled so as to be of the most benefit? The success with us has been very gratifying, as until about one

year ago gophers were very numerous all through our nursery, and an unused dwelling was literally alive with mice. When all at once, as if by magic, the mice left the building as we thought. We could see that the gophers were getting scarce, and in irrigating the water would run clear through the lot, where before the gopher holes were a great annoyance. About the same time weasels were seen occasionally skipping along through the nursery rows or down over the hillsides near the nursery, and frequently little squads of from two to four would be seen together. They could be seen to dive into an open squirrel hole and there remain some time.

Only one conclusion could be arrived at in noticing the actions of the weasels and the disappearance of the squirrels, and that is that the weasels have killed the squirrels. Such being the case we have not molested them, and they seem content in the killing business.

Without a doubt we have proved that the weasels are killing off the gophers and squirrels around our place, but unless the weasel will migrate of his own accord and look for new fields to conquer he may get to be as big a nuisance as the vermin he has just vanquished. At some future time I may be able to give more information. *L. C. Cummins.*

PLANTÆ CULTERATÆ EXSICCATÆ.

We take pleasure in announcing the commencement of the publication of a series of the useful and ornamental plants of the world, especially of those known in, or recommended as worthy of cultivation.

It is our aim to grow each species in San Diego, and to prepare herbarium specimens that shall completely represent the species included in the publication. The specimens will be prepared with great pains, under the direction of C. R. Orcutt, who has enjoyed personal instruction in this line of work from such botanists as the late Drs. Asa Gray, George Engelmann and C. C. Parry, and of that prince of collectors, Mr. C. G. Pringle, and whose specimens during ten years of active field work have given satisfaction to the conservators of many public and private herbaria.

Labels will give botanical and vernacular names, country of nativity (when known), general description (drawn from the fresh plant), colors described by actual comparison with Ridgway's Nomenclature of Colors, historical, economic and cultural notes—in fact, all the information necessary to render the representation of the species complete.

The price of the first century is placed at $10.00 (unmounted). Specimens will be carefully mounted for the herbarium at a moderate advance. Published only by subscription. Fleshy parts of flowers, and fruits, will be preserved in alcohol when desired.

Sections of ligneous plants made upon request.

Living plants and seeds of all commercial species supplied; while we anticipate the introduction of many interesting species worthy of cultivation through the efforts of our collectors in Mexico, Central and South Amcrica, and elsewhere.

Cultivated plants are usually neglected in herbaria and we trust our efforts in this direction will be appreciated by educational and scientific institutions, and that all interested in botanical or horticultural science will improve this opportunity and lend assistance to the work. *Orcutt Seed and Plant Company.*

San Diego, California.

A WOODLAND SCENE.

Roses wild and rushing waters,
Made a refreshing place,
Here the cedar bird came to drink,
The fawn to see its face.

Blue was the sky above them all,
The stars not far away,
And weary Peace might here have slept
Through all the livelong day.

Far from human pride and sorrow,
Dreamy was e'en the air,
But soon the woodman's axe was heard,
That opened a path to Care!

The rushing waters fled amazed,
Some feeble waves were caught,
And to man's way obedient
Were in his service taught.

The cabin and the busy mill,
Grew where the fawn had stood,
The wild rose and the cedar bird
Came no more to the wood.

Mrs. E. E. Orcutt.

SAN FRANCISCO MICROSCOPICAL SOCIETY.

[We are indebted to Mr. William E. Loy, the able recording secretary, for the following account of an instructive exhibition given by this society August 19, 1891.—EDITOR.]

A. H. Breckenfeld showed a beautiful live water spider, order Arachnidæ, genus Hydrachnea, on a dark field, which attracted a great deal of attention. Henry C. Hyde gave a pleasing exhibit of diatoms, one slide showing one hundred different species of naviculæ, mounted in styrax. S. E. Taylor showed a single frustule of a species of Arachnoidiscus, a beautiful genus of diatoms, with a low-angled half-inch objective and dark field illumination. L. M. King had on his stand an arranged slide of diatoms prepared by Rinnbock of Vienna. Charles C. Riedy exhibited a Navicula lyra with a one-fourth inch apochromatic objective and dark field.

R. H. Freund showed the only preparation of bacteria on exhibition, a species of pathogenic bacteria not identified. E. S. Runyon had a number of very attractive crystals, including the crystalizable principle from the prickly pear, Platino-cyanide of magnesium and Menthon crystals, all shown with polarized light and excellent effect. William E. Loy showed a young star-fish, Asterium gibbosa, with the aid of a spot lens.

The exhibition was further enhanced by brief informal addresses. Mr. Hyde gave an outline history of the Diatomacæ, showing first their place in botany, how generally they are dispersed about the globe, where they may be found, and a comparison of the fossil and recent forms. The peculiar structure of the diatom has preserved very perfect skeletons from the earliest geologic eras in which it is found, and when properly treated these fossils may be cleaned and mounted, yielding the most beautiful of all microscopic objects. He remarked that since the time of Ehrenberg many scientists had spent years of patient study in this captivating field, so that to-day many thousand species had been figured and described. Unlike some objects in nature, new beauties are seen with increased amplification, and the highest powers of the microscope only serve to increase the admiration of the beholder.

A. H. Breckenfeld gave a brief demonstration of the optical qualities of what is known as dark-field illumination. By this method the light is thrown around and upon the object, but its rays do not enter the objective nor reach the eye of the observer. The object then is shown on a dark back-ground, with a brilliancy not possible where the light passes directly through the object. His remarks were fully illustrated by drawings on the blackboard, and proved instructive and interesting. *William E. Loy.*

CALIFORNIA FIELD NOTES.

During the spring of 1889 I made a few field notes which it may be well to record without waiting to incorporate them into a more complete treatment of the respective plants. The colors mentioned were named by Ridgeway's Nomenclature of Colors from actual comparison in the field. Hookera minor, a common bulbous plant on our mesas, had the segments of the flower colored a royal purple with the tube of a perianth white. Hookera Orcutti, a new and lovely lilaceous plant, first discovered in 1882 and later in 1884, possesses a white perianth, the tips (and sometimes nearly the whole) of the segments lightly tinged with lavender, shading into a deep lavender to a royal purple. Allium serratum, a richly colored wild onion, has outer segments and the tips of the inner segments of the perianth a phlox purple, the base of the inner segments white. Allium unifolium, another pretty wild onion, has rose or purple-colored anthers and stigmas and bore from fifteen to fifty-five flowers (by actual count) in a single umbel (the latter umbel of flowers measuring four inches across). The flowers are pure white, tinged with rose on the outside along the midrib. The bulbs are one to three inches deep; the flower stems from three to fifteen inches in height; and the two or three leaves one-eighth to one-half inch wide and six to fifteen inches long. Zygadenus Fremontii, has a bulb buried three to five inches deep with leaves one-fourth to one inch wide and nine to eighteen inches long, and four or five in number. The flower stem varies from six to twelve inches high, bearing flesh-colored flowers with a greenish-yellow center. *C. R. Orcutt.*

LIBRARY CATALOGUE.

(Scientific books and periodicals may be ordered through our Book and Subscription Department.)

Recent accessions to the library of the West American Museum of Nature and Art will be catalogued monthly.

4132. Mandioca. By Thomas Morong. Reprinted from Bulletin of Pharmacy, June, 1891. From the author.

4133. Proceedings of the 16th annual meeting of the Amer. Association of Nurserymen, held at Minneapolis, Minn., 1891. Published by the Association. 160 pp, 8vo. 7 plates.

4144. The birds of Indiana, with illustrations of many of the species. By Amos W. Butler. Originally published in Trans. Ind. Hort. Soc., 1890. 135 pp. 8vo.

4145. American Society of Florists. Proceedings, 1886.

4146. Same, 1887.

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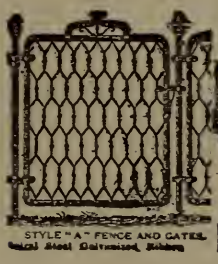

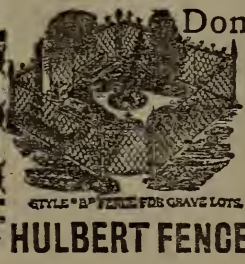

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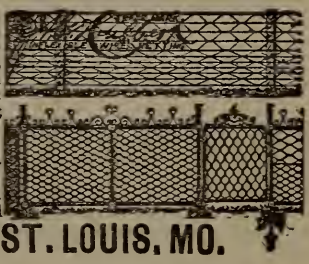

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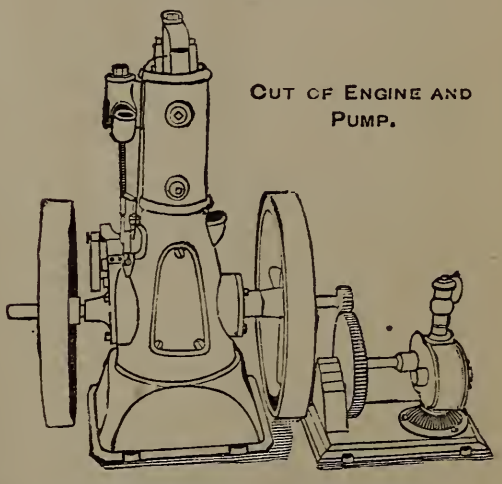

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